MASTER
NEGATIVE
NO. 95-82337-7

COPYRIGHT STATEMENT

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials including foreign works under certain conditions. In addition, the United States extends protection to foreign works by means of various international conventions, bilateral agreements, and proclamations.

Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

The Columbia University Libraries reserve the right to refuse to accept a copying order if, in its judgement, fulfillment of the order would involve violation of the copyright law.

Author:
Boadle, Albert E.

Title:
The British lumber market

Place:
Washington, D.C.

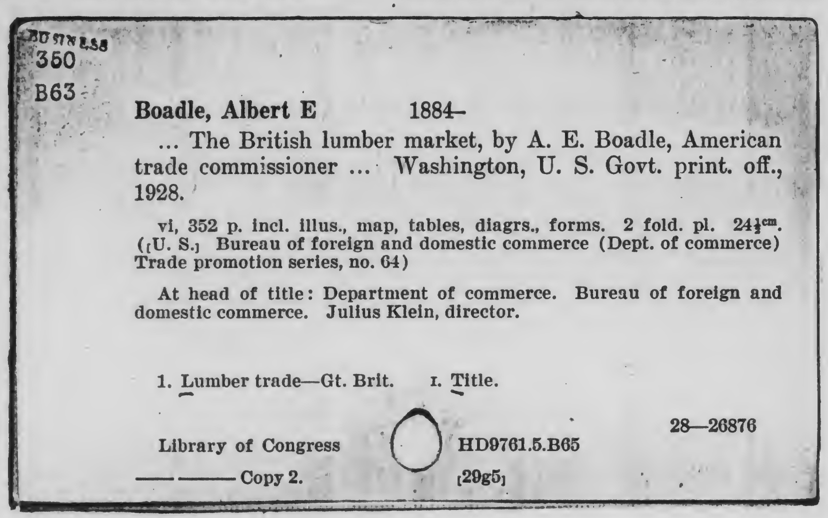
Date:
1928

95-82337-7
MASTER NEGATIVE #

COLUMBIA UNIVERSITY LIBRARIES
PRESERVATION DIVISION

BIBLIOGRAPHIC MICROFORM TARGET

ORIGINAL MATERIAL AS FILMED - EXISTING BIBLIOGRAPHIC RECORD



BUSINESS
350
B63

Boadle, Albert E 1884–

... The British lumber market, by A. E. Boadle, American trade commissioner ... Washington, U. S. Govt. print. off., 1928.

vi, 352 p. incl. illus., map, tables, diagrs., forms. 2 fold. pl. 24½cm. ([U. S.] Bureau of foreign and domestic commerce (Dept. of commerce) Trade promotion series, no. 64)

At head of title: Department of commerce. Bureau of foreign and domestic commerce. Julius Klein, director.

1. Lumber trade—Gt. Brit. I. Title.

Library of Congress HD9761.5.B65 28—26876
——— Copy 2. [29g5]

RESTRICTIONS ON USE:

TECHNICAL MICROFORM DATA

FILM SIZE: 35mm REDUCTION RATIO: 12x IMAGE PLACEMENT: IA [✓ IIA] IB IIB

DATE FILMED: 1-30-95 INITIALS: W.W

TRACKING # : 04210

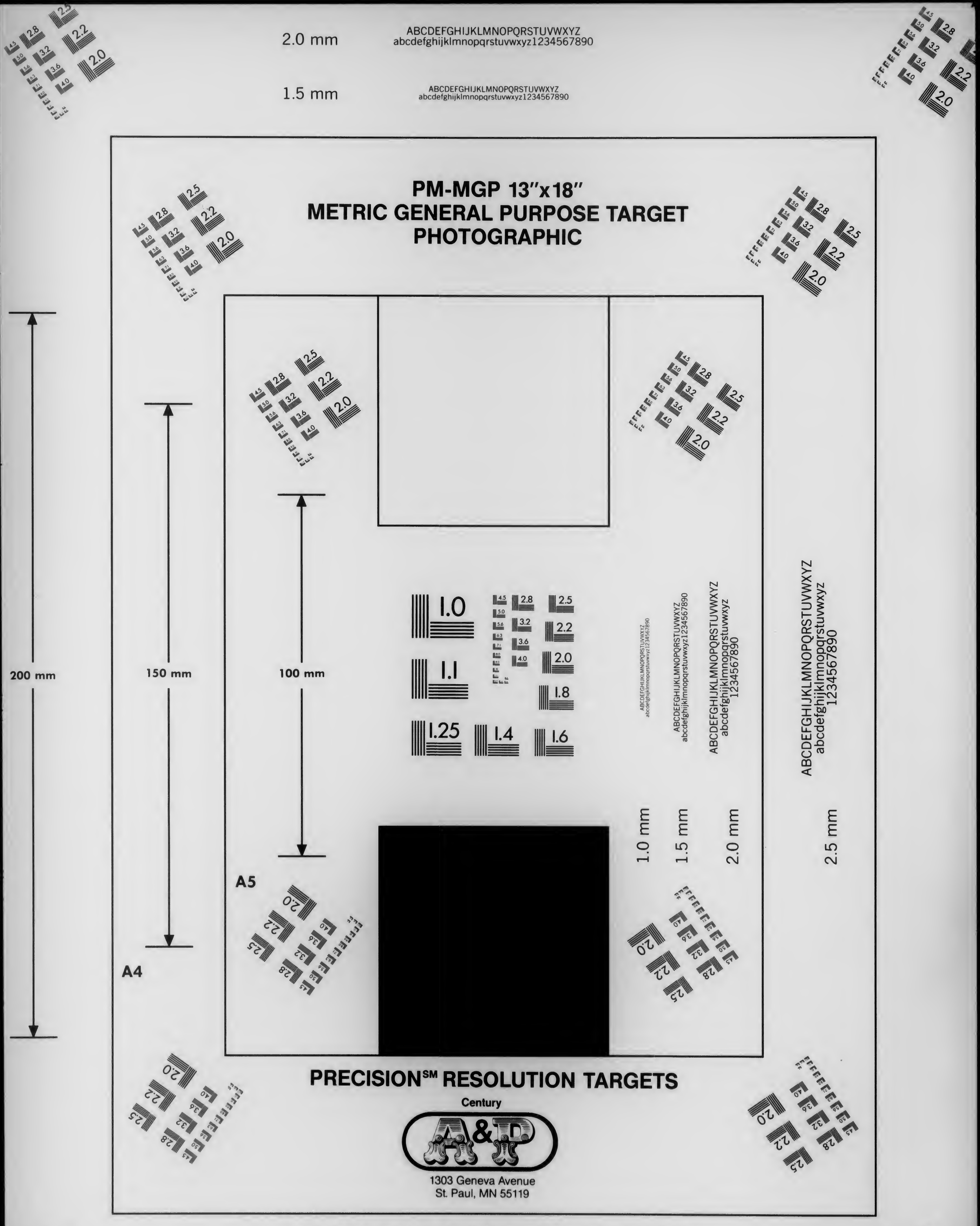
FILMED BY PRESERVATION RESOURCES, BETHLEHEM, PA.

INTENTIONAL
SECOND EXPOSURES
DUE TO
PHOTOGRAPHS OR
FADE CHANGES

2.0 mm
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

1.5 mm
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

PM-MGP 13″x18″
METRIC GENERAL PURPOSE TARGET
PHOTOGRAPHIC



1.0 mm
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

1.5 mm
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

2.0 mm
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

2.5 mm
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

PRECISION℠ RESOLUTION TARGETS

Century
A&P
1303 Geneva Avenue
St. Paul, MN 55119

4.5 mm
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

3.5 mm
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz1234567890

D350 B63

Columbia University
in the City of New York

LIBRARY

School of Business

DEPARTMENT OF COMMERCE
BUREAU OF FOREIGN AND DOMESTIC COMMERCE
JULIUS KLEIN, Director

TRADE PROMOTION SERIES—No. 64

THE BRITISH LUMBER MARKET

LIBRARY
SCHOOL OF BUSINESS
DEC 7 1928

By

A. E. BOADLE

American Trade Commissioner

LIBRARY
SCHOOL OF BUSINESS

PRICE 60 CENTS
Sold by the Superintendent of Documents, U. S. Government Printing Office
Washington, D. C.

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON
1928

Business

D350
B63

Jan 1929

CONTENTS

Page
Foreword v
Introduction 1
  Topography 1
  Drainage and climate 1
  Population and principal cities 2
  Occupations 2
  Commerce and shipping 2
  Transportation and communication 4
  Industries 5
  The British Empire 8
Forest resources 9
  Maintenance and afforestation 9
  Planting program 10
  Municipal and private afforestation 11
  Estimated results of program 12
  Forest products research 13
Native lumber industry 16
  Trade association 16
  Source of supplies 17
  Method of sawing 17
  Principal species and their uses 18
  Value of standing timber 20
  System of measurement 21
  European competition 21
  Custom sawing and planing 21
The import trade 26
  Character of imports 26
  Rank as market for American lumber 26
  Organization of the trade 27
  Warning to American exporters 29
  Division of the trade 30
  Trade associations 30
  Lumber exchanges 32
  The lumber trade press 32
  Sources of supply 33
  Principal ports of entry 37
  Factors in import trade 51
  Contracts 55
  Charter parties 65
  Marine insurance 73
  Claims 79
  Inspection of lumber 81
  Measurement of lumber, timber, and logs 81
  Grade marks and branding 83
  Consignments 84
  Auctions 85
Principal woods used in the United Kingdom 86
  Softwoods 86
    North European softwoods 86
    Eastern European softwoods 100
    Central European softwoods 103
    American softwoods 106
  Hardwoods 126
    Oak 126
    Red and sap gum 134
Page

Principal woods used in the United Kingdom—Continued.
  Hardwoods—Continued.

    Yellow poplar 135
    Mahogany 136
    Ash 145
    Teak 150
    Walnut 154
    Maple 158
    Birch 160
    Basswood 162
    Hickory 162
    Magnolia 163
    Tupelo 163
    Chestnut 163
    Cottonwood 164
    Beech 164
    Elm 165
    Philippine hardwoods 165
    Spanish cedar 165
    Borneo cedar 166
    Pencil cedar 166
    Greenheart 167
    Australian and New Zealand hardwoods 167
    Other hardwoods 168
Planing-mill products 170
  Flooring 170
  Matched lumber 175
  Other dressed lumber 176
  Flooring blocks 177
  Parquetry 183
Miscellaneous items 187
  Ties 187
  Pit props and mining timber 192
  Dimension stock 195
  Veneers 197
  Poling boards 198
  Roundwood 198
  Laths 198
  Firewood (short lengths) 199
  Poles 201
  Slating and tile battens 206
  Shingles 207
Wood-consuming industries 208
  Building and construction 208
    Postwar housing shortage 208
    Heavy construction 211
    Ready-cut houses 211
  Railroads 211
    Methods of purchase 212
    Permanent way 213
    Rolling stock 213
    Buildings and miscellaneous superstructures 218
    Miscellaneous items 219

Page

Wood-consuming industries—Continued.

- Furniture 220
  - Fashions and tendencies 220
  - Principal manufacturing centers 221
  - Dining-room furniture 221
  - Bedroom furniture 222
  - Inexpensive furniture 225
  - Upholstered furniture 225
  - Antique furniture 225
  - Kitchen furniture 225
  - Office furniture 226
  - School furniture 226
  - Moisture content of lumber 228
  - Dimension stock 228
  - Use of plywood 229
  - Exhibitions 229
  - Future outlook 229
  - Importance to American lumber exporters 230
- Cooperage 230
  - Import trade 230
  - Consuming industries 237
  - The cooperage industry 244
  - Outlook for American staves 248
- Shipbuilding 250
  - Location of principal shipyards 251
  - Quantity used in standard construction 252
  - Principal uses 252
- Motor vehicles 257
  - Passenger cars 258
  - Trucks 259
  - Omnibuses 259
  - Purchases and method of use 260
  - Criticism of American ash 260
  - Use of plywood 262
  - Future outlook 262
- Millwork 263
  - Principal woods used 263
  - Purchase of supplies 264
  - Trade organization 264
  - Equipment of mills 264
  - Manufactured products 265
  - Competition from wood substitutes 267
  - Utilization of waste 267
- Bank, office, and store fittings 268
  - Bank and office fittings 268
  - Store fixtures and fittings 268
- Wood-block paving 271
  - Organization of paving industry 271
  - Woods used 272
  - Prices of north European paving stock 272
  - Size of blocks and method of laying 272
  - American opportunities 273
- Dock and harbor construction 275
  - Method of construction 275
  - Principal woods used 275
  - Use of substitutes 278
- Boxes, crates, and packing cases 279
  - Species used and sources of supply 279
  - Production 279
  - Box shooks 280
  - American participation 281
- Musical instruments 282

Page

Wood-consuming industries—Continued.

Musical instruments—Continued.

  - The export trade 282
  - Pianos 283
  - Stringed instruments 284
  - Talking machines 284
  - Wood wind instruments 284
  - Organs 284
- Sporting and athletic goods 285
  - Cricket 285
  - Golf 286
  - Tennis 286
  - Hockey 287
  - Billiards 287
  - Bowls 287
  - Other sports 287
- Textile machinery 287
  - Principal woods used 287
  - Shuttles 288
  - Picker sticks 288
  - Frame rollers and bosses 289
  - Beams 289
  - Troughs 289
  - Thread spools and bobbins 290
- Airplanes 290
  - Principal woods used 290
- Pattern making 292
  - Canadian white pine 292
  - Other species 292
  - Prospects for American woods 292
- Coffins 292
- Plywood and veneer 294
  - Plywood 294
  - Veneer 295
- Radio cabinets 296
- Pencils 296
- Mining 297

Imports of wood manufactures 298
- Character of imports 298
- Builder's woodwork 298
  - Doors 299
  - Moldings 309
  - Window frames and sash 309
- Plywood 309
- Furniture and cabinet ware 321
- Household woodenware 322
- Tool handles 322
- Other wood manufactures 322

Comments and recommendations 324
- Manufacture 324
- Seasoning 325
- Specifications 326
- Prompt settlement of claims 327
- Douglas fir for house building 327
- End-matched lumber 327
- "Buy Empire goods" campaign 328
- Competition from central Europe 329
- Lesser known woods 330
- Technical and informative literature 330
- Advertising 331
- Exhibits 332
- Future outlook 332

FOREWORD

The United Kingdom is the largest wood-importing country in the world, imports of wood and wood manufactures during 1927 being valued at approximately $277,000,000. Of the countries that supply the British market the United States ranks third, being surpassed only by Finland and Sweden. The value of these imports from the United States during 1927 amounted to $42,000,000, or slightly over 15 per cent of the total British wood imports, which is practically the same percentage as obtained in 1913. The actual volume, however, is materially less, owing to the appreciation in values that have taken place since that time. In point of value the United Kingdom is the the most important foreign lumber market of the United States, taking during 1926 over 185,000,000 feet of hardwood lumber, valued at $13,500,000, for use by the furniture, interior fixture and fitting, and motor vehicle industries. In addition to hardwoods about 128,000,000 feet of softwoods, principally southern pine, Douglas fir, and spruce, are also exported annually to that market for use where large sizes or special qualities are required. Approximately 80 per cent of the mahogany lumber imported by the United Kingdom is supplied by the United States, it being manufactured here from logs imported largely from Central American countries.

Cooperage stock, doors, handles, and various other wood manufactures are also exported to Great Britain, the value of these during 1926 being approximately $12,500,000. An outstanding feature of these exports has been the rapid increase in the use of American doors in the British market, exports of which increased from 366,000 in 1924 to 1,514,000 in 1927. The increase is largely accounted for by the fact that American mass-production methods enable delivery of American-made doors in the United Kingdom at less than the cost of their domestic article.

This monograph, prepared by A. E. Boadle, American trade commissioner, is the result of an extensive investigation in the United Kingdom. Import trade is discussed in detail with special references to the principal woods imported and their chief uses, particular attention being given to those coming from the United States. The organization and operations of the import trade, the requirements of the principal wood-using industries, and factors that must be taken into consideration if business is to be successfully done in the British market are also covered. With improving industrial conditions in the United Kingdom opportunities for an increase in American participation in the wood import trade may reasonably be anticipated and various ways are indicated by which exporters can expand their sales in that market. Acknowledgment is made to the many members of the British lumber trade and wood-using industries and officials of the Forest Products Research Laboratory who rendered valuable assistance in the investigation.

The Lumber Division of the Bureau of Foreign and Domestic Commerce, in coöperation with oversea representatives of the Departments of Commerce and State, maintains close touch with markets throughout the world. The division will gladly reply to specific inquiries from United States exporters.

Julius Klein, *Director,*
Bureau of Foreign and Domestic Commerce.

March, 1928.

THE BRITISH LUMBER MARKET

INTRODUCTION

The United Kingdom consists of Great Britain (England, Scotland and Wales) and Northern Ireland. It is separated from the European Continent by the English Channel, the Straits of Dover, and the North Sea. The greatest distance from north to south is about 608 miles and from east to west about 320 miles, while the total area is about 89,041 square miles, or slightly less than the combined area of the States of Louisiana and Tennessee.

TOPOGRAPHY

The eastern coast of Great Britain forms a waving and continuous (though not unbroken) line, while the western coast is extremely irregular and deeply indented by many bays and arms of the sea. The surface of the southeast part is a level alluvial area, the center undulating and hilly, while the west and northwest is mountainous and irregular.

A series of mountain ranges occupies the greater part of the west and north, stretching from Cornwall, covering a large part of Wales, the western counties of England, and most of Scotland, the highest point being Ben Nevis, 4,406 feet, in Scotland.

DRAINAGE AND CLIMATE

There are eight important rivers, the largest being the Severn, Mersey, and Clyde in the west, the Thames, the Trent and the Ouse (with their estuary—the Humber), Tees, and Tyne in the east, and upon their banks are located the shipyards and cities through which the great export and import trade of the country passes.

No extremes of either heat or cold are experienced, the mean average temperature being about 48° F. Being surrounded by the ocean and having the Gulf Stream flowing near the western coast, the average temperature is equal to that of countries in much lower latitudes on the European Continent, while in winter it is much higher.

The rainfall is not heavy, averaging about 34 inches annually, but what it lacks in intensity it makes up with persistence, rain falling on the majority of the days of the year.

POPULATION AND PRINCIPAL CITIES

According to the census of 1921, the population of the British Isles was 42,919,710, the number of persons to the square mile in England and Wales being 649 and in Scotland 164.

The principal cities with their populations, according to the 1921 census, are as shown in the following statement:

London	7, 476, 168	Manchester	730, 551
Glasgow	1, 034, 069	Sheffield	490, 724
Birmingham	919, 438	Leeds	458, 320
Liverpool	803, 118	Bristol	377, 061

London is not only the political but also the commercial capital of the country and the headquarters of the lumber import trade.

OCCUPATIONS

According to the census returns of 1921, the occupations of the people of Great Britain (aged 12 years and upward) were as shown in the following table:

Classes	Men	Women	Total
Agriculture and fishing	1, 392, 607	107, 582	1, 500, 189
Clerical	627, 521	497, 661	1, 125, 182
Commerce and transportation	2, 770, 085	653, 794	3, 423, 879
Domestic service	371, 682	1, 844, 574	2, 216, 256
Government and defense	482, 410	77, 948	560, 358
Mines and quarries	1, 213, 633	6, 732	1, 220, 365
Professional	349, 208	404, 952	754, 160
Other	6, 448, 749	2, 108, 181	8, 556, 930
Total	13, 655, 895	5, 701, 424	19, 357, 319
Unoccupied	2, 016, 441	11, 865, 514	13, 981, 955
Grand total	15, 672, 336	17, 666, 938	33, 339, 274

COMMERCE AND SHIPPING

COMMERCE

The total value of imports and exports of merchandise (excluding bullion and specie and foreign merchandise transshipped under bond) of the United Kingdom for five recent years has been as shown in the following table:

Year	Imports	Exports
1922	£1, 003, 098, 889	£823, 202, 080
1923 [1]	1, 096, 226, 214	885, 801, 576
1924	1, 277, 439, 144	940, 936, 980
1925	1, 320, 715, 190	927, 417, 501
1926 [2]	1, 242, 863, 679	777, 458, 137

[1] From Apr. 1, 1923, the figures relate to Great Britain and Northern Ireland, and include the trade between that area and the Irish Free State.

[2] Provisional figures.

The following table shows the value, in thousands of pounds sterling, of imports and exports of the United Kingdom, by principal countries, for the year 1925:

Countries	Imports	Exports
Russia	25, 322	19, 257
Finland	13, 214	4, 698
Sweden	21, 327	13, 315
Norway	12, 978	8, 902
Denmark	49, 054	12, 181
Germany	48, 403	71, 489
Netherlands	45, 598	31, 684
Belgium	35, 557	28, 931
France	65, 042	54, 243
Switzerland	18, 966	10, 394
Spain	19, 887	11, 037
Italy	19, 289	21, 704
Czechoslovakia	10, 722	1, 787
Egypt	34, 201	16, 681
China	13, 448	14, 808
United States	245, 278	83, 205
Cuba	11, 629	2, 686
Chile	12, 357	6, 337
Argentina	68, 856	29, 735
Other	120, 451	122, 930
Total	891, 579	566, 004
British possessions and Dominions:		
Irish Free State	43, 382	51, 180
Cape of Good Hope	16, 575	14, 124
British India	80, 099	87, 235
Straits Settlements	18, 612	11, 815
Ceylon	17, 040	5, 194
Australia	72, 637	64, 024
New Zealand	51, 332	24, 184
Canada	70, 558	30, 684
Other	58, 901	72, 974
Total	429, 136	361, 414
Grand total	1, 320, 715	927, 418

The value, in thousands of pounds sterling, of the principal articles imported into the United Kingdom during the year 1925 was as shown in the following statement:

Food, drink, and tobacco:	
Grain and flour	111, 878
Feedstuffs	9, 068
Meat	122, 465
Animals, living, for food	17, 576
Other food and drink (nondutiable)	175, 350
Other food and drink (dutiable)	118, 180
Tobacco	17, 097
Raw materials, etc.:	
Mining products—	
Coal	20
Other	5, 746
Iron ore and scrap	5, 110
Nonferrous ores and scrap	16, 498
Wood and timber	46, 511
Raw cotton and cotton waste	125, 581
Wool and woolen rags	76, 033
Silk, raw, knubs and noils	1, 658
Other textile materials	18, 153
Oilseeds, oils, fats, gums, etc	55, 515
Hides and skins, undressed	21, 808
Paper-making materials	11, 109
Rubber	29, 744
Miscellaneous	11, 723

Manufactured articles:	
Coke and manufactured fuel	10
Earthenware, glass, etc	10, 095
Iron and steel manufactures	23, 999
Nonferrous metals and manufactures	38, 142
Cutlery, hardware, implements, etc	9, 666
Electrical goods and apparatus	4, 271
Machinery	11, 891
Manufactures of wood and timber	6, 229
Cotton yarns and manufactures	9, 831
Woolen and worsted yarns and manufactures	15, 126
Silk and silk manufactures	22, 584
Manufactures of other textile materials	18, 185
Apparel	21, 147
Chemicals, drugs, dyes, and colors	14, 402
Oils, fats, resins, and manufactures	36, 638
Leather and manufactures	15, 078
Paper and cardboard	15, 085
Vehicles (including ships and aircraft)	12, 308
Rubber manufactures	6, 328
Miscellaneous articles	28, 826
Animals, not for food	2, 303
Parcels post	3, 893
Total	1, 322, 858

SHIPPING

The total net tonnage of sailing, steam, and motor vessels that entered and cleared with cargoes and in ballast at ports in the United Kingdom during 1925, in thousands of tons, was as shown in the following table:

Flag	Entered	Cleared	Total entered and cleared
British	52, 021	52, 839	104, 860
Foreign	31, 997	32, 451	64, 448
Total	84, 018	85, 290	169, 308

Vessels registered as belonging to the United Kingdom at the end of the year 1925 were as shown in the following table:

Class	Number	Net tons
Sailing vessels	5, 785	519, 821
Steam and motor	12, 491	11, 463, 257
Total	18, 276	11, 983, 078

TRANSPORTATION AND COMMUNICATION

RAILWAYS

Great Britain is well covered with railroads and little additional construction is likely. The standard gauge is 4 feet 8½ inches, all but 150 miles being of that gauge.

The great increase in the use of motor chars-à-bancs since the end of the World War has had a detrimental effect on the number of passengers carried, and steps are being taken by the large railroad companies to operate motor vehicles in conjunction with their regular business.

According to the annual reports of the railway companies of Great Britain, furnished the Minister of Transport, there were on December 31, 1925, 20,391 miles of road open for traffic, an increase of 62 miles during the year. Expressed as single track, the total mileage of running lines was 37,019 miles (an increase of 105 miles) and of sidings 15,214 miles (an increase of 161 miles). The total mileage of single track, including sidings, was thus 52,233 miles.

The total number of passengers carried, exclusive of season ticket holders, during 1925 was 1,232,580,914, the number of season tickets (equivalent number of annual tickets) being 851,229 during the same period, as compared with 1,199,265,521 and 584,209, respectively, in 1913. Freight traffic during the same period amounted to 315,951,240 long tons; and livestock to the number of 18,662,650 were carried, as compared with 364,423,954 and 19,526,838, respectively, during 1913.

There are four principal railway systems, the mileage of which on December 31, 1926 (main lines), was as shown in the following statement:

	Miles
London, Midland & Scottish	7, 213
London & North Eastern	6, 721
Great Western	3, 817
Southern	2, 235
Total	19, 986

In addition, there are between 50 and 60 other lines, with few exceptions having only a very small mileage.

During 1925 there was an increase of 14.45 per cent in the mileage worked by electric traction, mainly owing to the extension of electrification of the Southern Co.'s system operating to the suburban districts around London. For long hauls, however, steam power is still exclusively relied upon. It is probable that the gradual electrification of suburban lines will take place in the next few years.

In addition to the railroads, there are a great number of tramway systems operated, many of them municipally owned, and also autobuses, while in London there is an extensive system of subways.

CANAL AND RIVER TRANSPORTATION

Excluding the Manchester Ship Canal, there originated on the railway-owned canals during 1925 a total of 2,030,675 long tons of traffic, while on other than railway-owned the total was 13,540,266 long tons. It is estimated that there are 4,673 miles of canals in the United Kingdom, of which 3,641 miles are in England and Wales.

The Manchester Ship Canal, opened in 1894, is 35½ miles in length and 28 feet in depth, and affords Manchester a deep-water outlet to the sea. It also has direct communication with all the principal railroad systems and canals of the country. The merchandise traffic paying toll in 1926 amounted to 6,830,879 tons, which was the largest tonnage to use the port of Manchester since the canal was opened.

INDUSTRIES

The United Kingdom is essentially an industrial nation, and upon the activity in what may be termed the "key" industries—textiles, engineering, shipbuilding, and mining—depends the prosperity of the country. The development of these industries was due to a large extent to the plentiful native supplies of coal and iron and to numerous navigable waters available.

TEXTILES

Of first importance are the textile industries, the value of the exports of which constitute about one-third the value of the total exports of the United Kingdom.

Cotton and wool are the most important branches, the total exports of which during 1925 were valued at £258,342,159. The center of the cotton industry is located in Lancashire, England—Manchester, Oldham, Preston, and Blackburn being the principal cities engaged in its manufacture.

The chief centers of the woolen industry are Huddersfield, Bradford, Leeds, and Dewsbury, in Yorkshire, while Halifax and Kidderminster are noted for carpets.

Other cities largely interested in the manufacture of textiles are Belfast (linen and poplin) and Dundee (jute), while the hosiery industry is largely centered in Nottingham and Leicester; also Paisley, in Scotland, is noted for its cotton-thread factories.

ENGINEERING AND SHIPBUILDING

Next in importance to the textile industry is the manufacture of machinery and metal goods, especial distinction having been obtained in the manufacture of hardware, cutlery, and locomotives, Birmingham, Sheffield, Newcastle-on-Tyne, Glasgow, Wolverhampton, Bradford, Leeds, and Oldham being prominent in this field.

The shipbuilding industry is of great importance, the principal building centers being located on the Clyde, Tyne, Wear, Mersey, and Tees Rivers. The total annual productive capacity of the shipyards of the United Kingdom is estimated to be about 3,000,000 tons. During 1925 steam and motor vessels to the number of 481 and a net tonnage of 642,708 and 329 sailing vessels with a net tonnage of 36,753 were built in British yards.

After the collapse of the postwar boom in 1920 the British shipbuilding industry suffered from great depression, and not until the end of 1926 did any improvement take place. This improvement steadily increased as the year progressed. The year closed with the greatest number of orders on the books since 1920.

MINING

Coal is the principal mineral produced in the United Kingdom, during 1925 a total of 243,176,231 long tons having a value at the pit of £198,978,154, being produced. The export trade is of paramount importance to the coal-mining industry, a total of 50,817,118 tons having a value of £50,477,211 being exported during the same year.

Next in importance is iron ore and ironstone, which amounted to 10,142,878 tons, valued at £2,918,963, during 1925.

Other minerals produced include oil shale, fire and china clay, and, to a very small extent, metals such as tin, zinc, lead, and copper.

The country is well supplied with building and road-making materials, such as limestone, sandstone, slate, and clay for brickmaking purposes.

AGRICULTURE

According to the annual report for 1926, issued by the Ministry of Agriculture, the tendency for the total area of agricultural land and arable area to diminish was again in evidence, although in the latter case the decrease was less than in either of the two previous years. There was a notable increase in the wheat area, while the acreage under sugar beets increased by no less than 130 per cent.

The following table shows the areas, in thousands of acres, under the various headings of agricultural land in England and Wales as returned by the occupiers during recent years:

Year	Arable	Permanent pasture	Rough grazings [1]	Total
1922	11, 311	14, 715	3, 762	29, 788
1923	11, 181	14, 762	3, 801	29, 744
1924	10, 929	14, 948	3, 862	29, 739
1925	10, 682	15, 073	3, 920	29, 675
1926	10, 548	15, 128	3, 939	29, 615

[1] In addition to the area of rough grazings returned by the occupiers there is an area of common land or mountain and heath land grazed in common, which is now estimated at approximately 1,124,000 acres.

In general the land is divided into small holdings, large farms being exceptional; out of a total of 402,638 in England and Wales, 261,826 did not exceed 50 acres in 1926. The number of workers employed on June 4, 1926, excluding the occupier, his wife, and domestic servants, was 794,899.

The following table shows the total quantity and acreage of each of the principal crops in Great Britain in 1926:

Crop	Quantity	Acreage
	Tons	
Wheat	1, 360, 000	1, 645, 984
Barley	1, 025, 000	1, 269, 944
Oats	2, 240, 000	2, 803, 525
Potatoes	3, 662, 000	641, 281
Turnips and swedes	17, 876, 000	1, 157, 404
Mangold	7, 142, 900	339, 273
Hay	8, 121, 000	6, 516, 081

The raising of cattle, horses, sheep, and pigs is also important, chiefly to meet home needs, but there is also a large export business done in blooded stock for breeding purposes.

FISHERIES

More than 16,000 fishing boats, with a total net tonnage of approximately 287,000, were registered as being engaged in the fishing industry during 1925. About 64,000 persons were employed on these vessels, the quantity of fish landed in Great Britain during that year being 962,558 tons, having a value of £18,678,850.

THE BRITISH EMPIRE

The British Empire is the largest in the world, extending into every quarter of the world and including every zone and climate within its limits. The lands or territories controlled by the United Kingdom have an area of 13,355,426 square miles and a population of 449,583,000.

The total forest area of the British Empire is estimated at 1,837,000 square miles, of which 685,000 square miles are at present marketable, according to Prof. R. S. Troup, of the Imperial Forestry Institute.

At the present time the most important of these is Canada, from which are imported large quantities of spruce, Douglas fir, and white pine, as well as birch and maple. British India is an important source of supply for teak, largely used by the railroad and shipbuilding industries, while quantities of mahogany logs are received from British Honduras and British West Africa.

FOREST RESOURCES[1]

According to the census of woodlands in 1924, the total area of woodland in the United Kingdom was 2,960,000 acres, of which less than one-half, or 1,417,000 acres, was high timber, the remainder including 330,000 acres of scrub, 478,000 acres cut over, 204,000 acres of shelter belts and park timber, and 528,000 acres of coppice and coppice under standards.

In the high-forest category were 672,000 acres of conifers, 302,000 acres of mixed conifers and hardwoods, and 443,000 acres of hardwoods.

The reserves of mature timber, according to this census, were mainly hardwood, of which 208,000 acres were over 80 years of age, against 77,000 acres "mixed" and 70,000 acres of conifers in the same age class.

The following table shows the total economic or potentially productive standing timber according to the 1924 census:

Classes	Age classes					
	1 to 10 years	11 to 20 years	21 to 40 years	41 to 80 years	Over 80 years	Total
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Conifers	105, 020	98, 030	153, 940	244, 520	70, 330	671, 840
Mixed	10, 720	15, 950	63, 430	134, 410	77, 180	301, 690
Hardwoods	4, 940	10, 470	39, 160	180, 540	208, 230	443, 340
Coppice and coppice under standards						528, 670
Scrub						330, 700
Felled and/or devastated						478, 100
Uneconomic, including amenity woods, shelter belts, park timber, etc., maintained for some purpose other than timber production for commercial purposes						204, 290
Total	120, 680	124, 450	256, 530	559, 470	355, 740	2, 958, 630

MAINTENANCE AND AFFORESTATION

During the war the great shortage of lumber resulting from the cessation of imports compelled immense drafts to be drawn upon native resources. No accurate data are available, but it is estimated that from 450,000 to 500,000 acres of woodland were cut either during or immediately following that period, yielding approximately 1,000,000,000 cubic feet of timber.

As a result of this practical demonstration of the value of the native forests the Government adopted, on the advice of the Acland committee, a forestry policy whereby 3,000,000 acres of pre-war woodland were to be maintained in a productive state and, in addition, by afforesting uncultivated land to reclaim 1,750,000 acres of coniferous lands in the course of 80 years, the work to be divided between the State and private and municipal owners.

---

[1] This section is largely based on the seventh annual report of the forestry commissioners and an article by R. I. Robinson in Forestry, a magazine dealing with forestry in the British Empire.

To carry out this work the Forestry Commission was established in 1919 and £3,500,000 promised to finance the first 10 years' operations. During this period the State was to plant 150,000 acres with conifers and a small area with hardwoods, while private and municipal authorities were expected to plant 110,000 acres (partly with State aid), making a total of 260,000 acres in all.

In order to encourage private forestry, the Government also inaugurated a system of grants and the systematic establishment of forest workers' holdings at the rate of five holdings per 1,000 acres of afforestable land. It is anticipated that these holdings, the occupiers of which are guaranteed 150 days' work per annum in the State forests, will make a useful permanent addition to the rural population in the poor grazing districts.

PLANTING PROGRAM

The work of the Forestry Commission is largely governed by what is known as the Acland report, which laid down the area to be planted each year under the 10-year program, although slight alterations were subsequently made.

CONIFERS

The following table shows the planting program of conifers, together with the areas actually planted, to the end of the fiscal year September 30, 1926:

Year	Program	Planted	Year	Program	Planted
	Acres	*Acres*		*Acres*	*Acres*
First year (1919-20)		1,094	Seventh year (1925-26)	18,400	17,997
Second year (1920-21)		5,660	Eighth year (1926-27)	22,600	
Third year (1921-22)	51,900	9,387	Ninth year (1927-28)	26,800	
Fourth year (1922-23)		9,758	Tenth year (1928-29)	30,300	
Fifth year (1923-24)		10,015			
Sixth year (1924-25)		14,282	Total	150,000	68,193

It will be noted that the total to the end of the fiscal year 1926 was 68,193 acres, as compared with the program of 70,300 acres. In addition to the areas covered by the foregoing, there were 1,697 acres planted in Ireland to March 31, 1922.

HARDWOODS

No definite program was laid down for the 10-year period, but small areas have been planted each year, as shown in the following statement:

	Acres		Acres
1919-20	116	1924-25	575
1920-21	269	1925-26	378
1921-22	175		
1922-23	656	Total	2,623
1923-24	454		

It is estimated that a total area of 4,000 acres will be planted with hardwoods during the 10-year period. The total area planted or sown, including both conifers and hardwoods, during the year ended September 30, 1926, was 18,375 acres, on which there were planted 38,835,000 trees consisting of 51 per cent Scotch and Corsican pines, 24 per cent Norway and Sitka spruces, 10 per cent European and Japanese larches, 9 per cent Douglas fir, and 6 per cent other varieties. From the inception of the forestry program to September 30, 1926, an area of 70,816 acres has been planted; and this total, added to the estimated planting for the remaining three years, gives a total of 139,000 acres for the 10-year period. As of September 30, 1927, there were 62 areas in England and Wales and 50 in Scotland under the control of the forestry commissioners.

The number of employees engaged in the forests of the commission since the inception of the present program has been as shown in the following table:

Year	Summer (minimum)	Year	Winter (maximum)
1920	210	1920-21	935
1921	495	1921-22	1,780
1922	525	1922-23	1,775
1923	880	1923-24	2,220
1924	1,620	1924-25	2,650
1925	1,980	1925-26	2,960
1926	2,335	1926-27	3,185

NOTE.—450 employees were transferred to the commission with the Crown woods on Apr. 1, 1924.

Out of the £3,500,000 due to be paid into the forestry fund under the forestry act, 1919, before March 31, 1929, £2,369,000 has been paid to September 30, 1926, leaving £1,131,000 still to be provided. Adding to this £252,000 on hand September 30, 1926, and estimating the net receipts from operations at £300,000, there should be available for gross payments over the two and one-half years still to run to March 31, 1929, a sum of £1,683,000 equivalent to an average gross expenditure of £673,000 per annum.

It is estimated that if the forest workers' holding program is to be carried out about £200,000 in excess of the £3,500,000 will be required, the total expenditure on forest workers' holdings being estimated at £336,500.

MUNICIPAL AND PRIVATE AFFORESTATION

Under the Acland report the area proposed to be afforested by local authorities and private owners with State assistance during the 10-year period was 110,000 acres, or an average of 11,000 acres per annum, but no annual program was laid down. Of this area 50,000 acres were to be covered by grants for replanting, 25,000 acres by grants for afforestation, 10,000 acres by loans for planting and replanting, and 25,000 acres by proceed-sharing schemes.

To date no progress has been made in promoting afforestation by loans, and proceed-sharing schemes have been restricted to two examples. Considerable progress, however, has been made in promoting afforestation and replanting by means of grants, both for unemployment relief and normal work. The following table indicates the amount of work carried out by means of grants:

Year	Planted	Prepared for planting	Cleared of scrub
	Acres	*Acres*	*Acres*
1921-22	10, 192	9, 127	3, 322
1922-23	6, 148	6, 075	2, 015
1923-24	6, 530	2, 772	1, 721
1924-25	7, 467	2, 597	1, 391
1925-26	4, 675		267
Total	35, 012	20, 571	8, 716

In addition to the foregoing, which shows the acreage for which grants were paid, there were also recipients of grants for "preparation for planting" who undertook to plant without further payments. It is therefore estimated that, taking these into consideration, the total area planted would exceed 55,000 acres.

In connection with the two proceed-sharing schemes already referred to, the following statement shows planting work, in acres, that has been done:

1919–20	357
1920–21	213
1921–22	257
1922–23	91
1923–24	320
1924–25	316
1925–26	197
Total	1, 751

It is estimated that the total area which will be planted by municipal authorities and private owners in the 10-year period with the assistance of the forestry commissioners will be approximately 75,000 acres.

ESTIMATED RESULTS OF PROGRAM

The 10-year forestry program has so far advanced that the commissioners have now made an estimate of the probable results which may be anticipated at the end of that period, which is shown in the following statement:

	Acres.
By the forestry commissioners:	
Conifers	135, 000
Hardwood	4, 000
Total	139, 000
By municipal and private owners:	
With State assistance	75, 000
Without State assistance	25, 000
Total	100, 000
Grand total	239, 000

It is admitted, however, that the figure given as representing the areas planted with State assistance is somewhat doubtful. This estimated result of 239,000 acres of both conifers and hardwoods is about 8 per cent less than the Acland committee put forward for conifers only.

FOREST PRODUCTS RESEARCH

Based on an article by Maj. F. M. Oliphant in "Forestry"

Following a recommendation by the Imperial Forestry Conference of 1920 there was established under the Department of Scientific and Industrial Research a Forest Products Research Board to organize and carry on research into the utilization of lumber and other forest products. As the result of a survey by the board, the Government set up a forest products research laboratory, and in October, 1925, a permanent director was appointed to organize and direct the work.

A site was acquired at Princes Risborough, Buckinghamshire, on which to build the laboratory, the work being carried on in the interim in temporary quarters at the Royal Aircraft Factory, South Farnborough, Hampshire. By the latter part of 1927, however, the erection of the permanent buildings had been completed and the equipment installed.

ORGANIZATION AND WORK

The laboratory has been organized under 10 different sections, the objects of their work being as shown in the following table:

Section	Typical subjects of study	Object
1. Timber mechanics	Strength properties of timber; influence of defects; influence of treatment (e. g., seasoning, preservation).	Correct selection of timber, and design.
2. Seasoning	Practice of air seasoning and kiln drying; kiln design.	Reduction of waste in seasoning.
3. Timber physics	Scientific study of the relations of water and heat to wood; physical chemistry.	Basic principles of seasoning.
4. Wood technology	Anatomical features in relation to uses; identification (in cooperation with Imperial Forestry Institute, Oxford).	Correct choice of species.
5. Pathology	Fungi and insects causing decay; toxicity of preservatives (in cooperation with Imperial Forestry Institute, Oxford, and Imperial College, London).	Causes of decay.
6. Wood preservation	Commercially practicable methods of treating timber with antiseptics; cheapening the cost.	Reduction of waste from decay.
7. Utilization	Study of industrial methods in order to insure the practical character of research and the advice offered. Investigations leading to new uses and markets for home and Empire grown timbers.	Liaison with industry.
8. Woodworking	Machining and finishing qualities and effects of treatment (e. g., degrees of seasoning) thereon.	Practical woodworking.
9. Chemistry of wood [1]	Constitution; changes under various treatments (e. g., seasoning), cellulose products, including those from waste wood (e. g., from sawdust). (In cooperation with St. Andrews University.)	Knowledge of wood substance.
10. Permanent records and library.	Recording and issue of information; reference library.	Ready and up-to-date information both to research workers and the trade.

PROGRAM AND ACHIEVEMENTS

Although it has been in operation for only two years, and during that time operating in restricted temporary quarters, the forest products research laboratory has made considerable progress. A few of the more important problems undertaken and the means by which they have been investigated are referred to under their respective sections.

Mechanics.—One of the first investigations undertaken by this section concerned the utilization of native or planted species for pit props. The species tested included both Scotch and Corsican pines, larch, Norway spruce, and Douglas fir, while the foreign species tested include Scotch pine and Norway spruce from Norway, Sweden, Finland, Poland, and Russia. This investigation is still in progress.

---

[1] At a later date it may be necessary to form, and include this work in, a section of minor forest products to deal also with extractives (tannins, resins, gums, etc.), destructive distillation, pulp and paper, and fibers.

In preparation for the work of testing structural timbers, tests have been made on Scotch and Corsican pine, larch, Douglas fir, and ash, to be followed later by oak, all in the green condition. Tests on air-seasoned material will follow. As an example of the great number of tests involved in this work it might be mentioned that those on ash, which dealt with nine trees from one locality, consisted of 1,114 mechanical tests and 1,699 complementary physical tests, with about the same number still to be carried out on seasoned specimens. It is proposed that the results of tests on oak shall be regarded as the datum line in comparing the strengths of British woods.

The laboratory has adopted as standard practice the use of the machines and methods of test proposed by the Forest Products Laboratory, United States Department of Agriculture, Madison, Wis., which was a pioneer in this and other fields of forest products investigation.

Seasoning.—This section carries on studies of both natural and artificial seasoning. An increasing amount of advisory work is being undertaken and in cooperation with the furniture industry investigations are being made by means of small samples of various woods, finished in various ways, placed in different positions and localities inside the house to discover the proper moisture content the furniture should possess for use in particular situations.

In the field of kiln-drying, experiments have been made with native Scotch pine, oak and Corsican pine, teak paneling for railroad finish, west coast hemlock, and Sitka spruce, the latter for use as airplane material. An experiment with ash for omnibus construction work is in progress, having for its object the comparison of the respective merits of air-dried and kiln-dried lumber.

Wood technology.—An important part of this section's work consists of indicating woods which, having similar characteristics, are likely to form efficient substitutes for other woods which are either becoming scarce or, being of foreign origin, might be replaced by an Empire product. A study has been undertaken in connection with the strength tests on ash, particularly that side of the investigation that concerns "brashness," or short grain in timber, in so far as this may be due to structure. Another study is concerned with the different working qualities found in oak, such as, for instance, the mild, easily worked variety that comes from Volhynia and Slavonia and the hard, strong oak, difficult to work, such as the native product.

Wood pathology.—One very important entomological investigation is nearing completion, namely, the losses caused by the Lyctus beetle to hardwoods when piled in storage. In cooperation with the section of seasoning, a kiln treatment has been developed using a model-size kiln, which promises to offer a practical solution of the trouble.

Wood utilization.—Of particular interest is the section of utilization, which acts as the liaison between the laboratory and industry. One of this section's principal duties is to translate the results obtained by the laboratory into commercial terms. To further its work, members of this section spend considerable time visiting various consuming industries and discussing wood utilization. One of the main objects aimed at is to promote the greater use of native and Empire grown lumber in place of that imported from foreign countries and to reduce waste by securing a more efficient utilization of lumber and other forest products. The work of this section has developed very rapidly, inquiries covering such varied matters as uses, market values, grading, supplies, and costs of various species.

One of its lines of investigation has been that of securing an Empire-grown substitute for American hickory for railway shunting poles, and one railroad has placed an order for 25 tons as a sample, which will be tested under actual working conditions. Sufficient time, however, has not elapsed to ascertain whether or not the wood will stand up under tests to which it is being subjected.

Another line of investigation has been the possibilities for utilizing small oak timber, of which there is a large acreage available in this country.

In conjunction with tests being made by the section of timber mechanics to ascertain the suitability of native species for pit props the section of utilization is investigating the requirements and conditions of use, grading and marketing cost, and transportation charges in various mining districts.

NATIVE LUMBER INDUSTRY

The native, or "home grown," lumber industry, as it is called, represents but a very small part of the British wood trade. It is to a great extent a specialized business, being centered mostly in the smaller provincial towns, such as Shrewsbury, Hereford, Norwich, and Ipswich.

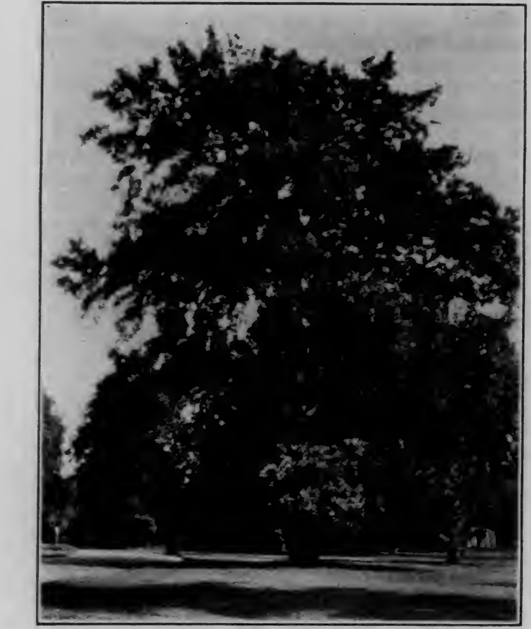


FIG. 1.—Native oak

While during the war, when imports of lumber were practically prohibited except for military purposes, the native lumber industry experienced a period of great prosperity at the cost of heavy depletion of supply, during the past few years it has suffered a severe depression.

Several factors, in addition to diminution of supply, are responsible for this, one being increased competition from continental Europe and the ease with which thoroughly seasoned stock can be obtained from foreign countries. The British climate prolongs the drying period for many months, so that considerable capital must be tied up in native stocks, whereas dry imported lumber can be sold immediately and capital turned over many times during the course of a year.

TRADE ASSOCIATION

Dealers in home-grown timber have their own association, known as The Federated Home-Grown Timber Merchants' Association, which is affiliated with the Timber Trades Federation of the United Kingdom. The objects of this association are to assist its members

in solving the difficulties that arise in connection with their business, such as loading charges, damage to roads, insurance, sawmilling regulations, wharfage charges, railroad rates, damage caused by removal of timber, conditions in contracts, factories legislation, licensing of tractors, income tax, and, in addition, to further the use of home-grown timber and to stabilize prices paid for standing timber.

SOURCE OF SUPPLIES

There are no large forests of standing timber in the United Kingdom, but it is well spread over the country, Norfolk, Herefordshire, and the southern counties, also some parts of Wales, being the most important. In addition, the Irish Free State and Northern Ireland ship logs to Great Britain. Although large areas have been planted by the Forestry Commission during the past few years, it will be some time before this timber reaches a cutting size. For the present, supplies are obtained direct from owners of large estates or by auctions held in the vicinity, the larger proportion being sold by the latter method. In addition, small quantities are purchased direct from local farmers.

When sold by auction, a catalogue is prepared showing the number of logs and actual cubical contents in each lot, not only the trunk but also the branches being included. Prospective purchasers then view the standing timber prior to the sale and try to check the contents of the trees marked. Auctioneers' measurements have to be accepted, and although they are largely based on estimates they are in the main accurate.

The price paid is for the trees as they stand, the felling, hauling, and all charges being paid by the buyer, as a rule, although occasionally estates sell their timber felled and trimmed.

Home-grown timber is described either as coppice, hedgerow, or park trees. Coppice trees are those that have grown up together in a small wood or coppice, usually on a large estate. It is from coppice trees that the best wood is obtained. Hedgerow trees are those that have grown in hedges without shelter and exposed to wind and weather. The wood from these trees is generally much harder and tougher than coppice-grown and frequently twisted and subject to many imperfections. Park trees are those which at some time or other have been planted for ornamental purposes, but which the owner has decided to sell. Many fine walnut and oak trees are obtained in this manner.

METHOD OF SAWING

When merchants cut the logs for storing purposes, they usually saw them through and through into various thicknesses, 2 inches and upward, while prime butts are cut into 1-inch boards. Should, however, an oak log show any signs of figure, it is cut on the quarter for paneling and sold when thoroughly seasoned. The usual period allowed for seasoning is one year to the inch.

The native timber is rangy and has many branches; the disposition of the top cuts and branches is a difficult problem, because all these are included in the sale contents and must be paid for. There is always a great accumulation of these at every sawmill cutting native

NATIVE LUMBER INDUSTRY

The native, or "home grown," lumber industry, as it is called, represents but a very small part of the British wood trade. It is to a great extent a specialized business, being centered mostly in the smaller provincial towns, such as Shrewsbury, Hereford, Norwich, and Ipswich.

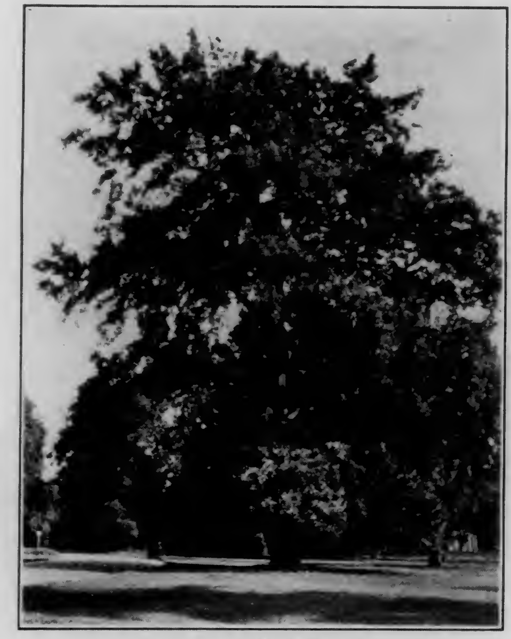


FIG. 1.—Native oak

While during the war, when imports of lumber were practically prohibited except for military purposes, the native lumber industry experienced a period of great prosperity at the cost of heavy depletion of supply, during the past few years it has suffered a severe depression.

Several factors, in addition to diminution of supply, are responsible for this, one being increased competition from continental Europe and the ease with which thoroughly seasoned stock can be obtained from foreign countries. The British climate prolongs the drying period for many months, so that considerable capital must be tied up in native stocks, whereas dry imported lumber can be sold immediately and capital turned over many times during the course of a year.

TRADE ASSOCIATION

Dealers in home-grown timber have their own association, known as The Federated Home-Grown Timber Merchants' Association, which is affiliated with the Timber Trades Federation of the United Kingdom. The objects of this association are to assist its members

in solving the difficulties that arise in connection with their business, such as loading charges, damage to roads, insurance, sawmilling regulations, wharfage charges, railroad rates, damage caused by removal of timber, conditions in contracts, factories legislation, licensing of tractors, income tax, and, in addition, to further the use of home-grown timber and to stabilize prices paid for standing timber.

SOURCE OF SUPPLIES

There are no large forests of standing timber in the United Kingdom, but it is well spread over the country, Norfolk, Herefordshire, and the southern counties, also some parts of Wales, being the most important. In addition, the Irish Free State and Northern Ireland ship logs to Great Britain. Although large areas have been planted by the Forestry Commission during the past few years, it will be some time before this timber reaches a cutting size. For the present, supplies are obtained direct from owners of large estates or by auctions held in the vicinity, the larger proportion being sold by the latter method. In addition, small quantities are purchased direct from local farmers.

When sold by auction, a catalogue is prepared showing the number of logs and actual cubical contents in each lot, not only the trunk but also the branches being included. Prospective purchasers then view the standing timber prior to the sale and try to check the contents of the trees marked. Auctioneers' measurements have to be accepted, and although they are largely based on estimates they are in the main accurate.

The price paid is for the trees as they stand, the felling, hauling, and all charges being paid by the buyer, as a rule, although occasionally estates sell their timber felled and trimmed.

Home-grown timber is described either as coppice, hedgerow, or park trees. Coppice trees are those that have grown up together in a small wood or coppice, usually on a large estate. It is from coppice trees that the best wood is obtained. Hedgerow trees are those that have grown in hedges without shelter and exposed to wind and weather. The wood from these trees is generally much harder and tougher than coppice-grown and frequently twisted and subject to many imperfections. Park trees are those which at some time or other have been planted for ornamental purposes, but which the owner has decided to sell. Many fine walnut and oak trees are obtained in this manner.

METHOD OF SAWING

When merchants cut the logs for storing purposes, they usually saw them through and through into various thicknesses, 2 inches and upward, while prime butts are cut into 1-inch boards. Should, however, an oak log show any signs of figure, it is cut on the quarter for paneling and sold when thoroughly seasoned. The usual period allowed for seasoning is one year to the inch.

The native timber is rangy and has many branches; the disposition of the top cuts and branches is a difficult problem, because all these are included in the sale contents and must be paid for. There is always a great accumulation of these at every sawmill cutting native timber, and while as much as possible is sawn into scantlings, which practically bring only the cost of manufacture, the remainder is sold as firewood at a loss.

Some consumers do their own cutting and fill their requirements from the log cut through and through, while others have logs sawn to whatever sizes they want. Some merchants again specialize in the manufacture of bends, rended and shaved (tennis-racket material), also squares which they sell ready made to the consuming industries.

FIG. 2.—Native ash

PRINCIPAL SPECIES AND THEIR USES

The principal merchantable species of native timber and their uses are as follows:

Oak.—The principal uses for oak are for railroad freight-car underframes, church framework, furniture, and paneling; high-class joinery such as doors, handrails, and window sills; coffin boards, fencing (riven), half timbering of houses; boat building for stem and stern posts, especially when in a natural bend for the bows of small boats; and squares for table and chair legs, spokes, naves, wheelbarrow handles, and ladder rungs.

There is, however, a brown oak much sought after for wainscot paneling, and permanent advertisements are carried in the trade press by merchants desiring to purchase it. Most of this is shipped to the United States, where it is sold at high prices. The price paid depends entirely upon quality and color, which can not, however, be estimated until the tree is felled, and as they are always bought when standing there is a considerable risk entailed as it is not at all certain that the color will extend through the whole log. So valuable are these logs that buyers will travel anywhere in the British Isles to secure a single tree.

Chestnut.—The Spanish variety is sold and used for the same purposes as oak where a less expensive wood is desired, except where strength is a factor, as in railroad-car constructon. There is, however, a special market for cleft chestnut pales used for fencing, the demand for which has considerably developed as a result of the advertising efforts of those interested in its manufacture.

Ash.—Native ash is exceptionally tough and for that reason is preferred to any of the imported varieties for motor-bus and chars-a-bancs construction, sports equipment (particularly frames of tennis rackets), longerons of airplanes, agricultural implements, handles, and wagon fellies.

FIG. 3.—Native beech

In addition to the ash grown in Great Britain, there are considerable quantities of logs received from the Irish Free State and, to a smaller extent, from Northern Ireland.

Elm.—Both the wych or mountain (*Ulmus montana*) and common elm (*U. campestris*) are commercially used, the wych being much harder in texture than the latter variety. They are used largely in the manufacture of tin-plate boxes, coffin boards, wheelbarrows, table legs, chair frames and seats, hubs or naves of wheels, and for fenders and gates in dock construction.

timber, and while as much as possible is sawn into scantlings, which practically bring only the cost of manufacture, the remainder is sold as firewood at a loss.

Some consumers do their own cutting and fill their requirements from the log cut through and through, while others have logs sawn to whatever sizes they want. Some merchants again specialize in the manufacture of bends, rended and shaved (tennis-racket material), also squares which they sell ready made to the consuming industries.

FIG. 2.—Native ash

PRINCIPAL SPECIES AND THEIR USES

The principal merchantable species of native timber and their uses are as follows:

Oak.—The principal uses for oak are for railroad freight-car underframes, church framework, furniture, and paneling; high-class joinery such as doors, handrails, and window sills; coffin boards, fencing (riven), half timbering of houses; boat building for stem and stern posts, especially when in a natural bend for the bows of small boats; and squares for table and chair legs, spokes, naves, wheelbarrow handles, and ladder rungs.

There is, however, a brown oak much sought after for wainscot paneling, and permanent advertisements are carried in the trade press by merchants desiring to purchase it. Most of this is shipped to the United States, where it is sold at high prices. The price paid depends entirely upon quality and color, which can not, however, be estimated until the tree is felled, and as they are always bought when standing there is a considerable risk entailed as it is not at all certain that the color will extend through the whole log. So valuable are these logs that buyers will travel anywhere in the British Isles to secure a single tree.

Chestnut.—The Spanish variety is sold and used for the same purposes as oak where a less expensive wood is desired, except where strength is a factor, as in railroad-car constructon. There is, however, a special market for cleft chestnut pales used for fencing, the demand for which has considerably developed as a result of the advertising efforts of those interested in its manufacture.

Ash.—Native ash is exceptionally tough and for that reason is preferred to any of the imported varieties for motor-bus and chars-a-bancs construction, sports equipment (particularly frames of tennis rackets), longerons of airplanes, agricultural implements, handles, and wagon fellies.

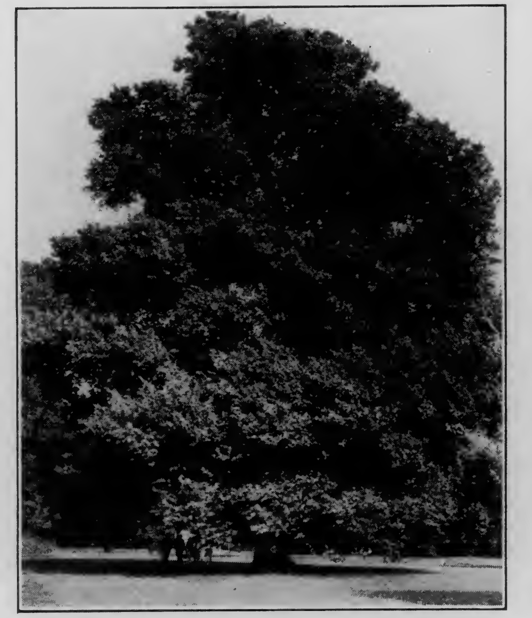


FIG. 3.—Native beech

In addition to the ash grown in Great Britain, there are considerable quantities of logs received from the Irish Free State and, to a smaller extent, from Northern Ireland.

Elm.—Both the wych or mountain (*Ulmus montana*) and common elm (*U. campestris*) are commercially used, the wych being much harder in texture than the latter variety. They are used largely in the manufacture of tin-plate boxes, coffin boards, wheelbarrows, table legs, chair frames and seats, hubs or naves of wheels, and for fenders and gates in dock construction.

Poplar.—Only the black Italian or Lombardy poplar (of the cottonwood family) is sold, and it is used for the same purposes as elm, also as a cheap substitute for American yellow poplar.

Scotch pine and spruce.—Both these woods are used for frames of cheap houses, for sheds, barns, gates, fences and other farm work, and for building purposes where a cheap softwood can be used; also for boxes, packing cases, and barrel heading, and some spruce is made into herring-barrel staves. The principal uses of these woods, however, is for pit props and small ties for use in mines.

Larch.—There are many uses for larch, among which are pit props and mining timber, light telegraph poles, fencing posts and rails, railroad ties, general construction work, and particularly for the keelsons and planking of life and other small boats. The branches and trimmings are also in demand for rustic garden work and furniture.

Beech.—This wood is largely used for the manufacture of boot and shoe lasts, wooden heels for ladies' shoes, clog soles, in various branches of the engineering industry (blocks and chucks), household woodenware, piano wrest planks, chair stock and garden furniture, mangle rollers, carpenters' planes, mallets, and tool handles.

Sycamore.—Another important native wood is sycamore, selected white logs being used for panelwork in offices, banks, high-class department stores, and steamship saloons. The best logs are made into veneer, but it is usual to use 1-inch lumber for panels. Very beautiful color effects are obtained by staining sycamore, a gray-green finish being particularly attractive and much used in the United Kingdom. Another important use is for mangle rollers, there being a large demand for this purpose.

Walnut.—Native walnut is considered the richest in color of any walnut sold in Great Britain. The quantity marketed each year, however, is very small, not exceeding one to two thousand trees a year, as most of those standing have great ornamental value or are utilized for their nut crop. For further details of this variety see walnut in the section on "Principal woods used in the United Kingdom."

Willow.—One of the most valuable of native woods is the cricket-bat willow, the only wood so far that has been found suitable for that purpose. As full details are given in the section on "Wood-consuming industries" it is unnecessary to repeat them here.

Other species.—Among other minor species of native woods for which there is a market are lime (basswood), cedar, birch, cherry, acacia (locust), alder, holly, and hornbeam. They are used for a variety of decorative and utility purposes, but the quantity available is so small that they are of little importance.

VALUE OF STANDING TIMBER

During the early fall of 1927 the approximate value of standing timber, per cubic foot actual contents, according to their species, was as follows:

	s.	d.	s.	d.		s.	d.	s.	d.
Oak (large)	2	0 to	3	0	Larch	1	0 to	1	6
Oak (fencing)	1	0 to	1	3	Spruce	1	0 to	1	6
Ash	2	6 to	4	0	Scotch pine	1	0 to	1	6
Beech	1	3 to	1	6	Chestnut	1	6 to	2	3
Elm	1	0 to	1	6	Walnut	4	0 to	8	0

The price paid naturally varies according to the size and quality of the timber and the cost of logging and transportation to the buyer's yard.

SYSTEM OF MEASUREMENT

Native logs are sold "string measure," Hoppus system, an allowance being made for bark amounting to 7½, 10, or 15 per cent, according to the species.

EUROPEAN COMPETITION

The competition from continental Europe has severely affected the native timber market during the past few years. Of these the principal species are oak imported as unedged lumber or logs sawn through and through from Volhynia, commonly called "Baltic" or "Polish," edged beech lumber from Czechoslovakia, Yugoslavia, and Rumania, and ash.

During the past few years there have been offered in the British market to an increasing extent shipments of ash from Austria and Yugoslavia which compare favorably with native timber for strength and toughness. It is imported in the form of edged lumber or uncut billets—i. e., logs with the center plank cut out and the slabs left on two sides, leaving an irregular piece of timber sawn on three sides. The long lengths in which the stock can be obtained make it a formidable competitor of the native variety, which is difficult to obtain either clean or dry enough.

FIG. 4.—Native walnut

CUSTOM SAWING AND PLANING

The custom sawing and planing industry is of considerable importance although, owing to the great variety of sizes imported from the European producing countries, the volume of softwood work is not

Poplar.—Only the black Italian or Lombardy poplar (of the cottonwood family) is sold, and it is used for the same purposes as elm, also as a cheap substitute for American yellow poplar.

Scotch pine and spruce.—Both these woods are used for frames of cheap houses, for sheds, barns, gates, fences and other farm work, and for building purposes where a cheap softwood can be used; also for boxes, packing cases, and barrel heading, and some spruce is made into herring-barrel staves. The principal uses of these woods, however, is for pit props and small ties for use in mines.

Larch.—There are many uses for larch, among which are pit props and mining timber, light telegraph poles, fencing posts and rails, railroad ties, general construction work, and particularly for the keelsons and planking of life and other small boats. The branches and trimmings are also in demand for rustic garden work and furniture.

Beech.—This wood is largely used for the manufacture of boot and shoe lasts, wooden heels for ladies' shoes, clog soles, in various branches of the engineering industry (blocks and chucks), household woodenware, piano wrest planks, chair stock and garden furniture, mangle rollers, carpenters' planes, mallets, and tool handles.

Sycamore.—Another important native wood is sycamore, selected white logs being used for panelwork in offices, banks, high-class department stores, and steamship saloons. The best logs are made into veneer, but it is usual to use 1-inch lumber for panels. Very beautiful color effects are obtained by staining sycamore, a gray-green finish being particularly attractive and much used in the United Kingdom. Another important use is for mangle rollers, there being a large demand for this purpose.

Walnut.—Native walnut is considered the richest in color of any walnut sold in Great Britain. The quantity marketed each year, however, is very small, not exceeding one to two thousand trees a year, as most of those standing have great ornamental value or are utilized for their nut crop. For further details of this variety see walnut in the section on "Principal woods used in the United Kingdom."

Willow.—One of the most valuable of native woods is the cricket-bat willow, the only wood so far that has been found suitable for that purpose. As full details are given in the section on "Wood-consuming industries" it is unnecessary to repeat them here.

Other species.—Among other minor species of native woods for which there is a market are lime (basswood), cedar, birch, cherry, acacia (locust), alder, holly, and hornbeam. They are used for a variety of decorative and utility purposes, but the quantity available is so small that they are of little importance.

VALUE OF STANDING TIMBER

During the early fall of 1927 the approximate value of standing timber, per cubic foot actual contents, according to their species, was as follows:

	s.	d.		s.	d.		s.	d.		s.	d.
Oak (large)	2	0	to	3	0	Larch	1	0	to	1	6
Oak (fencing)	1	0	to	1	3	Spruce	1	0	to	1	6
Ash	2	6	to	4	0	Scotch pine	1	0	to	1	6
Beech	1	3	to	1	6	Chestnut	1	6	to	2	3
Elm	1	0	to	1	6	Walnut	4	0	to	8	0

The price paid naturally varies according to the size and quality of the timber and the cost of logging and transportation to the buyer's yard.

SYSTEM OF MEASUREMENT

Native logs are sold "string measure," Hoppus system, an allowance being made for bark amounting to 7½, 10, or 15 per cent, according to the species.

EUROPEAN COMPETITION

The competition from continental Europe has severely affected the native timber market during the past few years. Of these the principal species are oak imported as unedged lumber or logs sawn through and through from Volhynia, commonly called "Baltic" or "Polish," edged beech lumber from Czechoslovakia, Yugoslavia, and Rumania, and ash.

During the past few years there have been offered in the British market to an increasing extent shipments of ash from Austria and Yugoslavia which compare favorably with native timber for strength and toughness. It is imported in the form of edged lumber or uncut billets—i. e., logs with the center plank cut out and the slabs left on two sides, leaving an irregular piece of timber sawn on three sides. The long lengths in which the stock can be obtained make it a formidable competitor of the native variety, which is difficult to obtain either clean or dry enough.

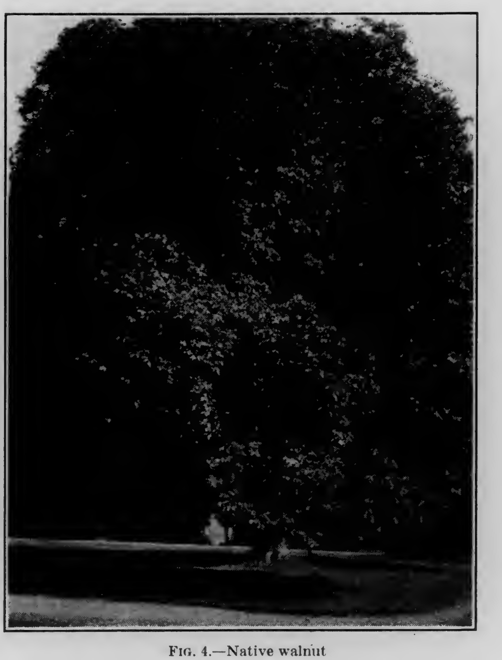


FIG. 4.—Native walnut

CUSTOM SAWING AND PLANING

The custom sawing and planing industry is of considerable importance although, owing to the great variety of sizes imported from the European producing countries, the volume of softwood work is not as great as formerly. However, owing to the absence of planing-mill facilities in Finland and most of the central European countries, they are compelled to ship lumber that is more suitable for manufacture as dressed stock than to be used in the rough. It is therefore an easy matter for British importers to figure the price they can pay for such lumber and have it manufactured into planing-mill products in Great Britain. In addition to this material, there is a considerable volume of resawing done to cut down large sizes to smaller ones in order to fill the demands of the building trade should a shortage develop. The sawing of mahogany and other hardwoods sold in the form of logs or timber is also an important part of a custom mill's business. Owing to the value of many of these woods, great accuracy in sawing must be observed.

The rates charged for sawing and planing are largely according to prices approved by local sawmill proprietors' associations, and, although there are some outsiders in every district, in the main the association rates govern. In addition to sawing and planing for the trade, custom mills also collect, deliver, and store, if required.

The following prices for sawing and planing hardwoods and softwoods are those adopted by the London Sawmill Proprietors' Association:

HARDWOODS

Species	Width under	Thickness		
		Under 1½ inches per 100 superficial feet	1¼ inches per 100 superficial feet	Planks over 1¼ inches per ton of 40 cubic feet
	Inches	*s. d.*	*s. d.*	*s. d.*
Cedar—Honduras and Cuba	24	9 3	11 0	46 8
Oregon, Kauri, southern pine	24	10 0	11 9	46 8
Wainscot, American ash	24	10 0	11 9	46 8
Yellow poplar, red gum	24	10 0	11 9	46 8
Japanese oak	24	10 0	11 9	46 8
Mahogany—Honduras	24	10 9	12 6	46 8
Mahogany—African	24	10 9	12 6	46 8
Mahogany—Gaboon	24	10 9	12 6	46 8
Cedar—Paraguay and Borneo	24	10 9	12 6	46 8
Birch and maple (square)	24	10 9	12 6	46 8
American oak and black walnut	24	11 6	13 3	48 0
Burma teak and padouk	24	13 9	15 9	55 0
Walnut—Italian and French	24	16 8	18 9	60 0
Hewn teak	24	17 6	20 0	60 0
Sabicu	24	20 6	22 0	70 0
Spanish and Cuban mahogany over 15 inches	24	13 0	15 0	50 0
15 inches and under		15 0	17 0	55 0
Yellow pine	24	8 6	10 0	35 0

(The prices of all woods, excepting yellow poplar and red gum, rise 1s. 9d. per 100 superficial feet for 24 inches and under 36 inches deep; 36 inches and above, an additional 1s. 9d. for every 6 inches.)

Logs and flitches under 30 inches wide, cut by horizontal saw, 1s. 9d. extra per 100 superficial feet.

Log ends, cut by horizontal saw, 3s. extra per 100 superficial feet.

Resawing hardwoods, 1¼ inches and under, 2s. 9d.; over 1¼ inches and including 2 inches, 3s. 6d.; over 2 inches and including 4 inches, 5s. 6d.; over 4 inches and under 8 inches, 7s. 9d.; 8 inches and under 12 inches, 12s. 6d. per 100 running feet.

Planks and sawn flitches, other than yellow poplar and California redwood, same prices as logs.

Yellow poplar planks, 4 inches and under by 12 inches and under, 7s. 6d. per 100 superficial feet; above, same prices as logs.

California redwood under 30 inches into 1 inch and under, 8s. 4d. per 100 superficial feet; 1¼ inches, 10s. 6d. per 100 superficial feet.

(One cut in planks and boards charged as two cuts.)

Species	Under 1¼ inches, per 100 superficial feet	1¼ inches, per 100 superficial feet	Planks over 1¼ inches, per ton of 40 cubic feet
	s. d.	*s. d.*	*s. d.*
English oak, walnut, beech, sycamore, plane tree, fir, elm, ash, chestnut, and lime tree—all depths	17 6	20 0	68 0
Foreign round ash (under 24 inches)	15 0	17 6	68 0
Foreign round elm and hickory	17 6	20 0	68 0
English and foreign hornbeam	20 0	23 0	75 6

All English and foreign round timber, sawn to boards, to be measured widest cut, minimum 12 inches wide.

All English timber and round foreign ash, elm, and hickory, sawn to planks, to be measured by tape over bark, minimum 10 inches quarter girth.

Satinwood and rosewood, above 1 inch to 2 inches, 41s. 9d. per 100 superficial feet.

Satinwood and rosewood, 1 inch and under, 31s. 6d. per 100 superficial feet.

Cartage is charged on satinwood and rosewood logs at 20s. per ton if sawn above 2 inches.

Cleating, 3d. per cleat.

Crosscuts, under 14 inches, 1s. 6d.; 14 and under 24 inches, 2s. 6d.; 24 and under 36 inches, 4s. 6d.; 36 and under 42 inches, 6s. 6d.; 42 inches and above, as per arrangement.

Breaking cuts, in all cases charged, without further sawing, at 68s. per ton of 40 cubic feet.

Breaking cuts, with further sawing, at pit sawing prices.

Logs measured after sawing, for sale purposes, under 24 inches, 2s. 6d. per log; 24 inches and upward, 4s.

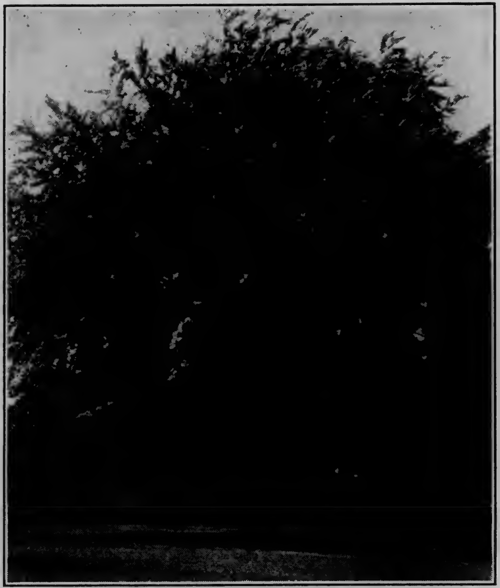


FIG. 5.—Native elm

Lifting logs, measured at mills by customs measurer or otherwise, cranage charge at 2s. 6d. per ton of 40 cubic feet.

Sticking, including one year's free storage, planks under 1¼ inches, 2s. 6d. per 100 superficial feet; 1¼ inches, 3s. per 100 superficial feet; over 1¼ inches, 10s. 6d. per 40 cubic feet; rent after one year charged on ground occupied at 3d. per square yard per week.

as great as formerly. However, owing to the absence of planing-mill facilities in Finland and most of the central European countries, they are compelled to ship lumber that is more suitable for manufacture as dressed stock than to be used in the rough. It is therefore an easy matter for British importers to figure the price they can pay for such lumber and have it manufactured into planing-mill products in Great Britain. In addition to this material, there is a considerable volume of resawing done to cut down large sizes to smaller ones in order to fill the demands of the building trade should a shortage develop. The sawing of mahogany and other hardwoods sold in the form of logs or timber is also an important part of a custom mill's business. Owing to the value of many of these woods, great accuracy in sawing must be observed.

The rates charged for sawing and planing are largely according to prices approved by local sawmill proprietors' associations, and, although there are some outsiders in every district, in the main the association rates govern. In addition to sawing and planing for the trade, custom mills also collect, deliver, and store, if required.

The following prices for sawing and planing hardwoods and softwoods are those adopted by the London Sawmill Proprietors' Association:

HARDWOODS

Species	Width under	Thickness		
		Under 1¼ inches per 100 superficial feet	1¼ inches per 100 superficial feet	Planks over 1¼ inches per ton of 40 cubic feet
	Inches	*s. d.*	*s. d.*	*s. d.*
Cedar—Honduras and Cuba	24	9 3	11 0	46 8
Oregon, Kauri, southern pine	24	10 0	11 9	46 8
Wainscot, American ash	24	10 0	11 9	46 8
Yellow poplar, red gum	24	10 0	11 9	46 8
Japanese oak	24	10 0	11 9	46 8
Mahogany—Honduras	24	10 9	12 6	46 8
Mahogany—African	24	10 9	12 6	46 8
Mahogany—Gaboon	24	10 9	12 6	46 8
Cedar—Paraguay and Borneo	24	10 9	12 6	46 8
Birch and maple (square)	24	10 9	12 6	46 8
American oak and black walnut	24	11 6	13 3	48 0
Burma teak and padouk	24	13 9	15 9	55 0
Walnut—Italian and French	24	16 8	18 9	60 0
Hewn teak	24	17 6	20 0	60 0
Sabicu	24	20 6	22 0	70 0
Spanish and Cuban mahogany over 15 inches	24	13 0	15 0	50 0
15 inches and under		15 0	17 0	55 0
Yellow pine	24	8 6	10 0	35 0

(The prices of all woods, excepting yellow poplar and red gum, rise 1s. 9d. per 100 superficial feet for 24 inches and under 36 inches deep; 36 inches and above, an additional 1s. 9d. for every 6 inches.)

Logs and flitches under 30 inches wide, cut by horizontal saw, 1s. 9d. extra per 100 superficial feet.

Log ends, cut by horizontal saw, 3s. extra per 100 superficial feet.

Resawing hardwoods, 1¼ inches and under, 2s. 9d.; over 1¼ inches and including 2 inches, 3s. 6d.; over 2 inches and including 4 inches, 5s. 6d.; over 4 inches and under 8 inches, 7s. 9d.; 8 inches and under 12 inches, 12s. 6d. per 100 running feet.

Planks and sawn flitches, other than yellow poplar and California redwood, same prices as logs.

Yellow poplar planks, 4 inches and under by 12 inches and under, 7s. 6d. per 100 superficial feet; above, same prices as logs.

California redwood under 30 inches into 1 inch and under, 8s. 4d. per 100 superficial feet; 1¼ inches, 10s. 6d. per 100 superficial feet.

(One cut in planks and boards charged as two cuts.)

Species	Under 1¼ inches, per 100 superficial feet	1¼ inches, per 100 superficial feet	Planks over 1¼ inches, per ton of 40 cubic feet
	s. d.	*s. d.*	*s. d.*
English oak, walnut, beech, sycamore, plane tree, fir, elm, ash, chestnut, and lime tree—all depths	17 6	20 0	68 0
Foreign round ash (under 24 inches)	15 0	17 6	68 0
Foreign round elm and hickory	17 6	20 0	68 0
English and foreign hornbeam	20 0	23 0	75 6

All English and foreign round timber, sawn to boards, to be measured widest cut, minimum 12 inches wide.

All English timber and round foreign ash, elm, and hickory, sawn to planks, to be measured by tape over bark, minimum 10 inches quarter girth.

Satinwood and rosewood, above 1 inch to 2 inches, 41s. 9d. per 100 superficial feet.

Satinwood and rosewood, 1 inch and under, 31s. 6d. per 100 superficial feet.

Cartage is charged on satinwood and rosewood logs at 20s. per ton if sawn above 2 inches.

Cleating, 3d. per cleat.

Crosscuts, under 14 inches, 1s. 6d.; 14 and under 24 inches, 2s. 6d.; 24 and under 36 inches, 4s. 6d.; 36 and under 42 inches, 6s. 6d.; 42 inches and above, as per arrangement.

Breaking cuts, in all cases charged, without further sawing, at 68s. per ton of 40 cubic feet.

Breaking cuts, with further sawing, at pit sawing prices.

Logs measured after sawing, for sale purposes, under 24 inches, 2s. 6d. per log; 24 inches and upward, 4s.

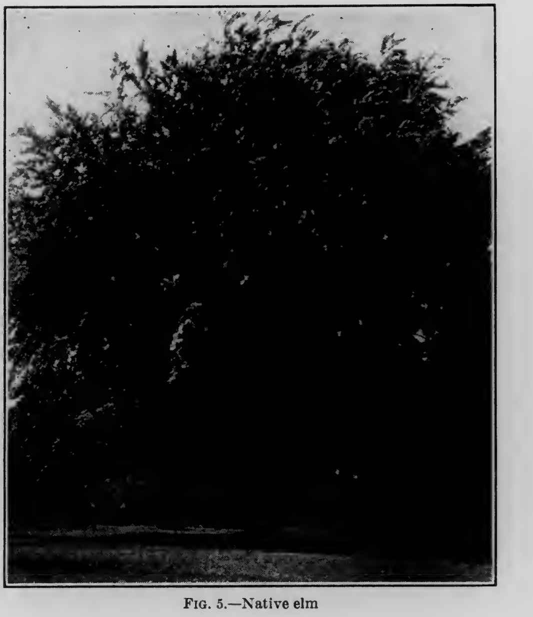


Fig. 5.—Native elm

Lifting logs, measured at mills by customs measurer or otherwise, cranage charge at 2s. 6d. per ton of 40 cubic feet.

Sticking, including one year's free storage, planks under 1¼ inches, 2s. 6d. per 100 superficial feet; 1¼ inches, 3s. per 100 superficial feet; over 1¼ inches, 10s. 6d. per 40 cubic feet; rent after one year charged on ground occupied at 3d. per square yard per week.

Rent charged on all logs, planks, and boards for which cutting instructions have not been given within four months from date of receiving order, at 4d. per ton per week.

A charge of 20s. per barge per day will be made on all craft detained alongside ship or quay receiving goods over side beyond two days.

SOFTWOODS

Ripping or resawing lumber laid on its edge:
  12 inches and up at 5s. per 100 superficial feet.
  9 to 11 inches and up, at 4s. per 100 superficial feet.
  7 to 8 inches and up, at 4s. 3d. per 100 superficial feet.
  6 to 6½ inches and up, at 5s. per 100 superficial feet.
  5 to 5½ inches and up, at 5s. 3d. per 100 superficial feet.
  4½ inches and up, at 5s. 6d. per 100 superficial feet.
Flatting or resawing lumber laid on its face:
  2 inches and under, at 1s. 3d. per 100 running feet.
  3 inches and under, at 1s. 6d. per 100 running feet.
  3½ inches and under, at 1s. 9d. per 100 running feet.
  4 inches and under, at 2s. per 100 running feet.
Less 10 per cent February 1, 1923.
With a minimum rate per standard equal to 3 deep in 3 inches.

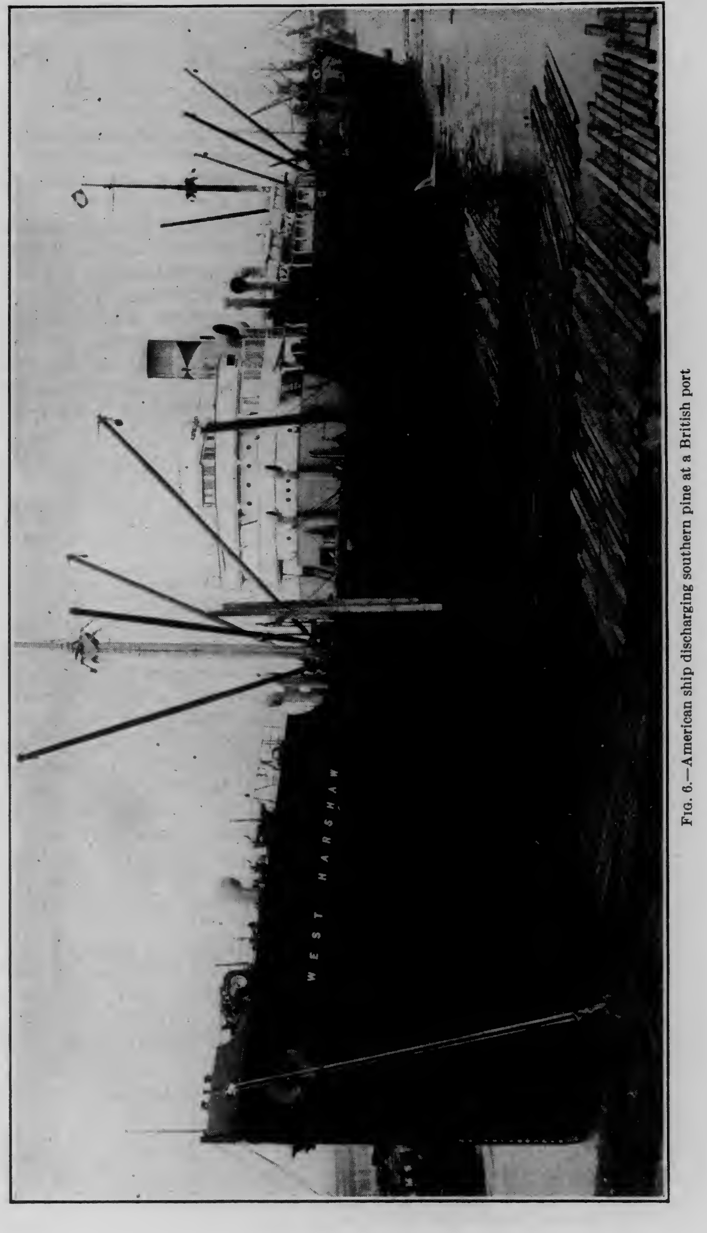


FIG. 6.—American ship discharging southern pine at a British port

Rent charged on all logs, planks, and boards for which cutting instructions have not been given within four months from date of receiving order, at 4d. per ton per week.

A charge of 20s. per barge per day will be made on all craft detained alongside ship or quay receiving goods over side beyond two days.

SOFTWOODS

Ripping or resawing lumber laid on its edge:
  12 inches and up at 5s. per 100 superficial feet.
  9 to 11 inches and up, at 4s. per 100 superficial feet.
  7 to 8 inches and up, at 4s. 3d. per 100 superficial feet.
  6 to 6½ inches and up, at 5s. per 100 superficial feet.
  5 to 5½ inches and up, at 5s. 3d. per 100 superficial feet.
  4½ inches and up, at 5s. 6d. per 100 superficial feet.
Flatting or resawing lumber laid on its face:
  2 inches and under, at 1s. 3d. per 100 running feet.
  3 inches and under, at 1s. 6d. per 100 running feet.
  3½ inches and under, at 1s. 9d. per 100 running feet.
  4 inches and under, at 2s. per 100 running feet.
Less 10 per cent February 1, 1923.
With a minimum rate per standard equal to 3 deep in 3 inches.

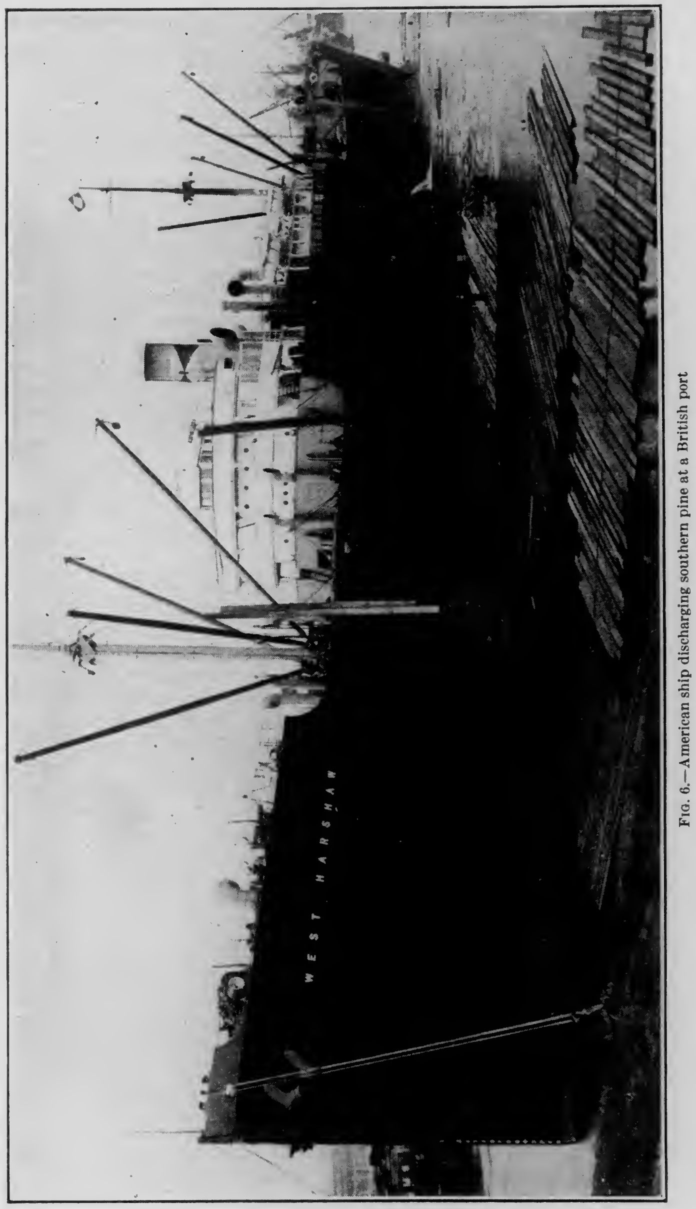


Fig. 6.—American ship discharging southern pine at a British port

THE IMPORT TRADE

Only a very small proportion of the lumber needs is obtained from native sources, and the United Kingdom has become the largest of all import lumber markets, with nearly every producing country shipping supplies to it.

The bill for these imports is a heavy one, as will be seen from the following statement of imports of unmanufactured wood; and efforts are being made by the British Government to encourage a greater quantity being purchased within the Empire, and also, by means of afforestation in the United Kingdom, to increase timber supplies and by research to effect closer utilization. This latter work not only has the object of reducing the import bill but also of supplying the country's imperative needs in time of war or other emergency, thus releasing ocean tonnage which would otherwise be required for carrying lumber.

1913	£33, 788, 884	1923	£47, 746, 000
1919	72, 306, 469	1924	51, 070, 684
1920	82, 145, 214	1925	46, 496, 039
1921	30, 021, 962	1926	39, 268, 876
1922	37, 321, 017	1927	49, 060, 619

NOTE.—From Apr. 1, 1923, the above figures include the trade of Great Britain and Northern Ireland with the Irish Free State. From the same date the direct foreign trade of the Irish Free State has been excluded.

CHARACTER OF IMPORTS

Apart from such items as pit props, telegraph and scaffolding poles, and "roundwood" used for box making and staves, most of the wood imported is semimanufactured, either square hewn, rough sawn, or dressed in the form of flooring, matching, and other planing-mill products. With the exception of small quantities of ash, hickory, mahogany, oak wainscot billets, and fancy woods, which are imported in the log either from lack of manufacturing facilities in the country of origin or for some particular reason (such as the wider widths and longer lengths obtainable, selection for figure, panel matching, or veneering) the British lumber trade prefers to buy either lumber or timber. As a consequence, the remanufacturing industry in this country is of very small proportions and confined almost entirely to resawing.

It might be added that, with the great increase in transportation and handling charges since the war, there has been a growing tendency toward the import of more highly refined stock, such as squares, and the demand for them will doubtless show a steady increase from now on. (Imports of wood manufactures are discussed in detail on pages 298 to 323.)

RANK AS MARKET FOR AMERICAN LUMBER

In point of value the United Kingdom is the most important foreign market for United States woods; during 1926, according to official figures issued by the Department of Commerce, exports to that country valued at $20,625,372 amounted to 326,456,000 feet. Not only is it an important outlet for softwoods, such as southern pine, Douglas fir, and Sitka spruce, but a little over one-half of the exports of hardwoods are sold in the British market.

Of the total exports of hardwood lumber, amounting to 352,538,000 feet, valued at $24,995,453, during 1926, no less than 185,366,000 feet, or slightly more than 52 per cent, valued at $13,640,699, went to the United Kingdom, it being easily the greatest foreign market for American oak, yellow poplar, gum, ash, and mahogany, and second only to Canada for walnut; in fact, with very few exceptions, every American commercial hardwood finds a sale in that market.

In addition, it is an important foreign market for American wood manufactures, such as cooperage, hardwood flooring, and doors, handles for tools, and agricultural implements, there being no tariff to limit their import as in many other countries.

The following statistics published by the Bureau of Foreign and Domestic Commerce[2a], showing the principal American exports of lumber, timber, and logs, in thousands of board feet, to the United Kingdom during 1926, indicates the importance of the British market as an outlet for American wood:

Southern pine	97, 335	Ash	15, 285
Douglas fir	22, 014	Mahogany	15, 096
Spruce	7, 025	Other species	27, 908
Oak[1]	98, 343		
Poplar	23, 266	Total	326, 456
Gum[2]	20, 184		

PRESENT STATUS

America's share of the British wood import trade increased on the basis of value from 15.25 per cent in 1913 to 15.92 per cent in 1925, and was third in importance as a source of supply, being exceeded (only slightly) by Finland and Sweden in point of value.

This situation is the more remarkable when it is remembered that this increase has taken place in spite of the severe industrial depression from which the United Kingdom has been suffering since the collapse of the 1920 postwar boom, and depreciating exchanges favoring the central European hardwood-producing countries which compete with American lumber.

ORGANIZATION OF THE TRADE

The import trade has been well organized for many years and is carried on under well-defined lines, any departure from which is considered unethical. The various sections into which it is divided are agents and brokers, importers, and merchants or dealers, a brief explanation of their functions being as follows:

AGENTS AND BROKERS

Firms who describe themselves as wood agents are understood to act as representatives of foreign shippers, being the medium through which sales are transacted between them and the British importer; they must not act as principals. Agents must also confine their sales to recognized importers. Brokers act as agents for only designated importers and shippers. There are firms operating as both agents and brokers.

---

[1] Oak logs and hewn timber included in "other species."

[2] Logs included in "other species."

[2a] Detailed figures for United States exports of wood to the United Kingdom in 1927 appear in the appendix.

Most of the lumber imports are handled through these agents, who charge a commission for selling and handling the documents; it is also customary for them to guarantee the solvency of the buyer or carry the del credere, as it is called, for which an extra payment is made. The two—commission and del credere—are usually combined and a single rate charged.

Local brokers.—There are firms who act solely as local brokers between importer and importer or between importer and merchant. The customary commission charged for this service is usually 1 per cent. For this they merely buy or sell; the invoicing and delivery orders are all made out and forwarded by the firms for whose account the goods are sold. Some of the larger agents who transact this kind of business have a "brokerage department" and describe themselves as "agents and brokers" because, besides acting as sales representatives for foreign shippers, they will also sell for the local trade if asked to do so, but their commission is usually more than 1 per cent.

FIG. 7.—Lumber in importer's yard; method of piling permits any length to be taken out of one pile

IMPORTERS

The question of what constitutes an "importer" has been debated for many years, and although attempts from time to time have been made, no solution has been arrived at so far that is satisfactory to everybody. There is, however, a list of firms dealing in north European softwoods that has been drawn up and approved in joint conference between the Timber Trades Federation of the United Kingdom and the Swedish and Finnish lumber exporters' associations, at which it was agreed that sales on an import basis should be restricted to those whose names appear on it. This list is held confidential and is said to contain between 600 and 700 names; it includes some large consumers who, by virtue of past business or importance, have been able to have themselves recognized as importers and entitled to buy on the most advantageous terms.

It can not be said that it has given entire satisfaction, many complaints emanating from both the agents and the larger importers who state it is far too large; also from others who, having been left off, claim they are entitled to be included. What constitutes a hardwood importer is even more difficult to define but, broadly speaking, the term may be applied to firms who regularly deal in wholesale quantities on a c. i. f. basis. Here again, there are some large consumers who buy their requirements on importers' terms.

MERCHANTS AND YARD KEEPERS

Firms designated as merchants may also be importers, the description "importers and merchants" frequently being used to describe merchants who buy on importers' terms.

Apart from the "importer-merchant," the name "merchant" may be said to describe any firm that deals in lumber, either in wholesale or retail quantities.

Last of all are the yard keepers; these do a business similar to that of the merchants except that the individual transactions are much smaller. The term "retail trade" as used in the United States is seldom heard in the United Kingdom, "yard keeper" being the nearest equivalent.

AMERICAN BRANCH OFFICES

Two large American lumber manufacturers have established their own selling organizations in Great Britain. The cost of such branches, however, is such that a large business must be done to justify them; and besides, the profits made by such an office are liable to the British income tax, which is not payable on business done through regularly established wood agents.

AMERICAN REPRESENTATIVES

According to British law, foreign firms are liable for income tax on profits accruing from trade exercised within the United Kingdom through an agent. The distinction between a broker (business through whom is not liable) and an agent (whose business is taxable) has never been clearly defined in British courts. The Division of Commercial Laws, Bureau of Foreign and Domestic Commerce, Washington, has on file the latest information on this matter furnished by the office of the commercial attaché, London, and obtained by a member of that division who has made a study in England of such matters. American lumber exporters who contemplate appointing a direct representative to look after their interests in the United Kingdom would be well advised to communicate with the Commercial Laws Division before taking any action.

WARNING TO AMERICAN EXPORTERS

American lumber exporters are warned against having direct dealings with importers. While by doing so a little commission may be saved, should troubles over payment of drafts or claims arise, it would be difficult to obtain the services of any responsible agent to protect their interests. Exception is here made with respect to sales to a few firms definitely recognized as "direct importers" by the British lumber trade.

Most of the lumber imports are handled through these agents, who charge a commission for selling and handling the documents; it is also customary for them to guarantee the solvency of the buyer or carry the del credere, as it is called, for which an extra payment is made. The two—commission and del credere—are usually combined and a single rate charged.

Local brokers.—There are firms who act solely as local brokers between importer and importer or between importer and merchant. The customary commission charged for this service is usually 1 per cent. For this they merely buy or sell; the invoicing and delivery orders are all made out and forwarded by the firms for whose account the goods are sold. Some of the larger agents who transact this kind of business have a "brokerage department" and describe themselves as "agents and brokers" because, besides acting as sales representatives for foreign shippers, they will also sell for the local trade if asked to do so, but their commission is usually more than 1 per cent.

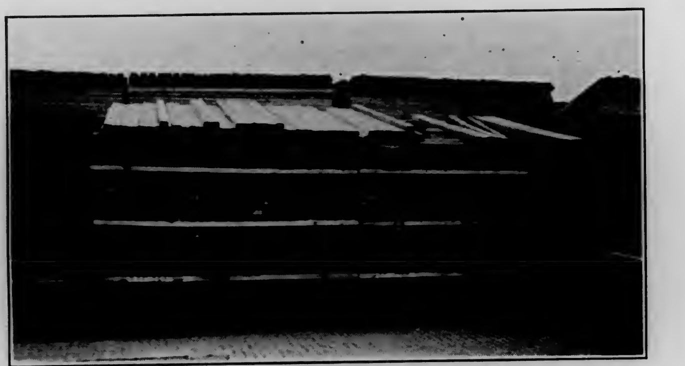


FIG. 7.—Lumber in importer's yard; method of piling permits any length to be taken out of one pile

IMPORTERS

The question of what constitutes an "importer" has been debated for many years, and although attempts from time to time have been made, no solution has been arrived at so far that is satisfactory to everybody. There is, however, a list of firms dealing in north European softwoods that has been drawn up and approved in joint conference between the Timber Trades Federation of the United Kingdom and the Swedish and Finnish lumber exporters' associations, at which it was agreed that sales on an import basis should be restricted to those whose names appear on it. This list is held confidential and is said to contain between 600 and 700 names; it includes some large consumers who, by virtue of past business or importance, have been able to have themselves recognized as importers and entitled to buy on the most advantageous terms.

It can not be said that it has given entire satisfaction, many complaints emanating from both the agents and the larger importers who state it is far too large; also from others who, having been left off, claim they are entitled to be included. What constitutes a hardwood importer is even more difficult to define but, broadly speaking, the term may be applied to firms who regularly deal in wholesale quantities on a c. i. f. basis. Here again, there are some large consumers who buy their requirements on importers' terms.

MERCHANTS AND YARD KEEPERS

Firms designated as merchants may also be importers, the description "importers and merchants" frequently being used to describe merchants who buy on importers' terms.

Apart from the "importer-merchant," the name "merchant" may be said to describe any firm that deals in lumber, either in wholesale or retail quantities.

Last of all are the yard keepers; these do a business similar to that of the merchants except that the individual transactions are much smaller. The term "retail trade" as used in the United States is seldom heard in the United Kingdom, "yard keeper" being the nearest equivalent.

AMERICAN BRANCH OFFICES

Two large American lumber manufacturers have established their own selling organizations in Great Britain. The cost of such branches, however, is such that a large business must be done to justify them; and besides, the profits made by such an office are liable to the British income tax, which is not payable on business done through regularly established wood agents.

AMERICAN REPRESENTATIVES

According to British law, foreign firms are liable for income tax on profits accruing from trade exercised within the United Kingdom through an agent. The distinction between a broker (business through whom is not liable) and an agent (whose business is taxable) has never been clearly defined in British courts. The Division of Commercial Laws, Bureau of Foreign and Domestic Commerce, Washington, has on file the latest information on this matter furnished by the office of the commercial attaché, London, and obtained by a member of that division who has made a study in England of such matters. American lumber exporters who contemplate appointing a direct representative to look after their interests in the United Kingdom would be well advised to communicate with the Commercial Laws Division before taking any action.

WARNING TO AMERICAN EXPORTERS

American lumber exporters are warned against having direct dealings with importers. While by doing so a little commission may be saved, should troubles over payment of drafts or claims arise, it would be difficult to obtain the services of any responsible agent to protect their interests. Exception is here made with respect to sales to a few firms definitely recognized as "direct importers" by the British lumber trade.

DIVISION OF THE TRADE

While most agents handle both hardwoods and softwoods, each being taken care of in its own department, comparatively few importers do so, each branch of the industry being considered a separate business. In the outports, however, where the volume handled is comparatively small, both woods are handled. The fancy hardwood trade, such as satinwood, rosewood, ebony, lignum-vitae, cocus wood, partridge wood, and boxwood is also a separate branch of the trade, the entire imports being handled by a very few firms.

TRADE ASSOCIATIONS

Trade association work is highly developed in the United Kingdom lumber trade, covering all branches and numbering among its members every firm of note in the country.

Of the existing associations, the Timber Trades Federation of the United Kingdom is by far the most important; in fact, it may almost be said to be the only association, because the other three—i. e., the Timber Agents and Brokers Association of the United Kingdom, the Association of Timber Importers, and the Hardwood Legal Protection Association—while separate legal entities, are closely affiliated with it, being composed of members of the first-named body. They were organized principally with the object of undertaking certain work falling outside the scope of the federation, or that which their members believe can best be undertaken by an organization having complete freedom of action.

The Timber Trades Federation of the United Kingdom.—The great central organization of the British lumber trade—the Timber Trades Federation of the United Kingdom—with its permanent offices in London, was started in 1893 with a membership of 248 firms, which number had increased by the end of 1926 to about 1,000. It acts as a clearing house so that the views of the trade on any particular matter may be centralized and put forward as its collective opinion. In this manner, when matters affecting the general interests of the trade as a whole arise, instead of a number of individual efforts, united action with the strength of the entire lumber trade behind it is taken.

Among the federation's other activities are the arranging of charter parties, contract forms, appointing of umpire or arbitrator where one party to a contract fails to do so, collecting and disseminating such statistical information as may be available, and voicing the views of the industry on legislative matters.

In view of its importance and representative character, it is recognized as the official medium of communication by the Government, railroad companies, foreign shippers, and shipowners.

In addition to what be called purely national work, there are special sections of the federation, such as hardwood, softwood importers, merchants, pit wood, plywood, railroad tie, native or home-grown trade, and home-grown pit wood, dealing with their own particular branches of the trade. There are also regional organizations in the principal importing centers for dealing with their own local matters and sending representatives to the central body for periodical conferences, as follows:

Bristol Channel Timber Importers Association.
East Anglian and South Lincolnshire Importers Section.
Humber District Section.
Irish Free State.
Northern Ireland.
Liverpool Timber Trades Association.
Manchester Timber Trade Association.
North East Coast Section.
Scottish Section.
South Coast Timber Merchants and Importers Association.
Western Counties Timber Trade Association.

The special sections of regional organizations and Agents and Brokers Association all have representatives on the executive council of the national federation.

The Timber Agents and Brokers Association.—Practically every wood agency firm in the United Kingdom is a member of this association. Its activities, however, are almost entirely concerned with the European softwood branch of the import trade, conducting the negotiations between the British importers and foreign shippers' associations on such matters as forms of contract, bills of lading, charter parties, marine insurance, and arbitration. Similar matters connected with hardwoods, plywood, etc., are handled by the particular section of the timber trade federation concerned.

Association of Timber Importers.—In April, 1926, there was promoted by a group of the leading softwood importers the Association of Timber Importers of the United Kingdom, among the objects stated for which it was established, according to the application for a license, being:

> To protect, promote, and develop the general welfare and interest of timber importers, particularly of those carrying on business in the United Kingdom of Great Britain and Northern Ireland by cooperation, and to maintain and extend their usefulness for the public advantage; to communicate with chambers of commerce and other mercantile and public bodies, and concert and promote measures for the protection and advancement of the businesses of timber importers, and to circulate among the members information on all matters affecting such businesses and the timber trade generally, etc.

Among the matters that have been dealt with since its formation have been negotiations with the Finnish and Swedish lumber exporters associations with a view to cooperation in preventing shipments on consignment to this market and the question of uniform terms of sale in the softwood trade.

Also, when in September, 1927, soon after the Finnish and Swedish stock lists and prices for the following season's delivery appeared, it requested the agents and brokers' association and also the shippers' associations that further negotiation be deferred until December 1 as it considered the time premature for forward buying. Such a request coming from an association composed, as it is, of the leading buyers, could not fail to have considerable weight with the parties concerned.

Although much of the first year of the association's existence was taken up with the process of organization, the above illustrations give some indication of its line of activity and its influence is likely to grow as time progresses.

Hardwood Legal Protection Association (Ltd.).—This association was registered in June, 1926, for the purpose of promoting the interests of the timber trade generally and of the hardwood section in particular, from a legal, commercial, and financial point of view. It also represents its members in litigations affecting the handling of wood goods, especially in disputes with steamship companies concerning shortage and damage.

The association, while at present concerned only with London firms, already has a membership of over 100.

LUMBER EXCHANGES

In some of the larger lumber-importing cities, such as London, Liverpool, and Manchester, there are lumber exchanges or informal gatherings of agents, importers, and chartering agents, where sales are concluded and information regarding the market exchanged. These meet usually once a week, either on the premises of the local lumber trade association or in some hotel. They not only serve the members of the trade in the particular city in which they are held, but also offer a convenient place for out-of-town visitors and foreign shippers to meet the trade.

THE LUMBER-TRADE PRESS

There are three principal periodicals in the United Kingdom devoted to the lumber trade—namely, The Timber Trades Journal, Timber and Plywood, and The Timber News. In addition to the import trade, which naturally is the most important, they include sections covering plywood and veneer, the native lumber industry, forestry, sawmill and woodworking machinery, and lumber transport. These journals have a wide circulation, not only in the British Isles, but also on the Continent of Europe, the reason being that this country is by far the most important outlet for north European softwoods, and upon conditions in this market largely depends the attitude of the producing countries.

The advertising columns of the journals are largely used by European lumber exporters as a medium through which their brands and selling agents may become known to the British import trade. Many exporters also illustrate their advertisements with pictures of their stock and plant, thereby calling attention to the excellence of their lumber.

American lumber journals as well as the principal Swedish lumber journals, are widely read, and copies of those dealing with both the hardwood and softwood branches are found in many offices.

In addition to the regular journals, there are a number catering to the larger wood-using industries, such as building and construction, furniture, and packing; the architectural profession also has its own organ, while there are several journals catering to the home.

The following are the principal publications dealing with the lumber trade and principal wood-consuming industries:

The Timber Trades Journal, Bouverie House, Fleet Street, London, E. C. 4.
Timber and Plywood, 131–133 Middlesex Street, London, E. 1.
Timber News, 20 St. Bride Street, London, E. C. 4.
Architects Journal, 9 Queen Anne's Gate, London, S. W. 1.
The Architect, Imperial Building, New Bridge Street, London, E. C. 4.
The Builder, 4 Catherine Street, London, W. C. 2.
Building News, Arundel Street, Strand, London, W. C. 2.
The Contractor, 130 Temple Chambers, London, E. C. 4.
The Furnishing Trades Organizer, Regent House, Kingsway, London, W. C. 2.

The Furniture Record, 36 Worship Street, London.
The Cabinet Maker, Bouverie House, Fleet Street, London, E. C. 4.
Illustrated Carpenter and Builder, 8 Temple Avenue, London, E. C. 4.
Homes and Gardens, 20 Tavistock Street, London, W. C. 2.
Ideal Home, 57 Long Acre, London, W. C. 2.
Town and Country Homes, La Belle Sauvage, London, E. C. 4.
The Packing Gazette, 139 Fleet Street, London, E. C. 4.

SOURCES OF SUPPLY

Every producing country in the world is drawn upon to furnish wood to the United Kingdom. It is the great open lumber market where there is a buyer for every species, and direct steamship connections with every country take all varieties there to be sold.

The following is a brief discussion of the principal sources of supply, which, for convenience, have been segregated into a few main groups producing similar species.

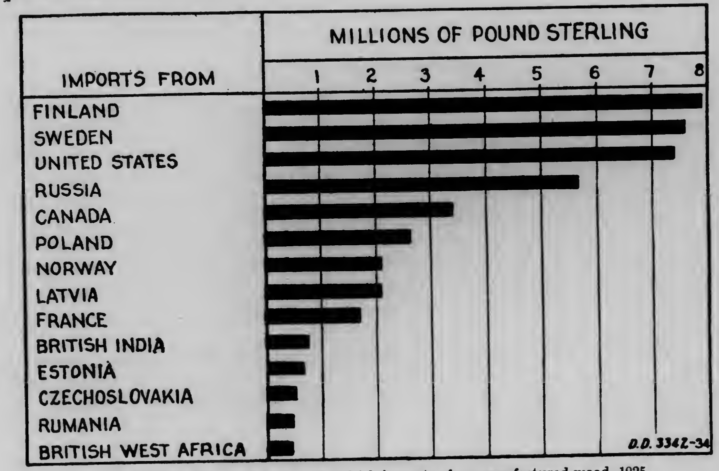


FIG. 8.—Principal sources of British imports of unmanufactured wood, 1925

NORTHERN AND EASTERN EUROPE

Finland, Sweden, Russia, Poland, Norway, Latvia, and Estonia furnish the bulk of the softwood lumber used for ordinary housebuilding, joinery, box, and packing-case industries. The lumber industry is highly developed in these countries, and their nearness to the United Kingdom enables them to deliver their product at a very low cost.

In addition to lumber, these countries also furnish large quantities of softwood telegraph and scaffolding poles, pit props, railroad ties, and staves.

Some oak and ash are furnished by Poland, and oak by Russia; both countries also ship oak staves to that market.

UNITED STATES

Next in importance as a source of supply is the United States, the principal source of hardwoods used by the furniture and cabinetmaking industry, also for motor vehicles, musical instruments, and flooring. The United States is also the principal source of Great Britain's supply of mahogany lumber, the logs being shipped to the United States from Central America, manufactured into lumber, and reexported to the United Kingdom.

In addition, there are also imported large quantities of softwoods from the United States, such as southern pine, Douglas fir, and Sitka spruce, used for purposes where size, strength, or other special qualities are required. Staves are also obtained from the United States.

CANADA

Canada is the principal wood-producing country within the British Empire and furnishes the home market with large quantities of spruce, white pine, birch, and maple from the eastern Provinces, also Douglas fir and Sitka spruce from British Columbia.

Eastern Canada still has considerable white pine standing timber in convenient proximity to the seaboard and, as a result, now has a virtual monopoly of the business in the United Kingdom.

FRANCE AND CENTRAL EUROPE

Although not generally thought of as a lumber-producing country, France ranked ninth among those furnishing the United Kingdom with wood during 1925. Over 90 per cent of it, however, was represented by pit props grown in the southwestern section and shipped as return freight on vessels which had brought coal from South Wales.

Czechoslovakia, Rumania, and Yugoslavia furnish an inferior quality of softwood as compared with the more northerly countries, it being used chiefly for the cheaper class of houses and by the box and packing-case industries. These countries also furnish important quantities of oak and beech, the justly famous Austrian oak coming from Yugoslavia.

Although Italy appears in British statistics as supplying wood to that country, very little originates in Italy, most of it being represented by stock grown in Yugoslavia and exported through the Italian ports of Fiume and Trieste.

BRITISH INDIA AND SIAM

Practically the entire supply of teak is obtained from British India and Siam, the production of this species being an important industry in both countries. British India also ships small quantities of various other hardwoods, but the quantity is unimportant.

WEST AFRICA AND BRITISH HONDURAS

Most of the mahogany logs sold in the auction sales of Great Britain originate either in British or French West Africa or British Honduras. West Africa also supplies a certain quantity of other hardwoods, chiefly used for furniture and decorative purposes, such as African walnut, obeche, and ebony.

OTHER COUNTRIES

Among other countries contributing to the wood needs of the United Kingdom are Australia, with karri and jarrah; Japan, with oak and ash; Irish Free State, principally ash; Newfoundland, pit props; Philippine Islands, various hardwoods; British Guiana, greenheart.

The following table shows the value of imports, by countries of origin, of unmanufactured wood into the United Kingdom during the year 1925:

Countries	Total value	Round and hewn hardwood		Round and hewn softwood	
		Quantity	Value	Quantity	Value
		Cubic feet		*Loads*[1]	
Finland	£7,965,618	225,180	£19,495	69,701	£157,406
Sweden	7,619,245	102,194	10,797	48,809	210,346
United States	7,405,047	1,091,012	213,333	71,924	565,235
Russia	5,753,314	98,438	18,379	159,322	378,889
Canada	3,491,643	597,963	149,679	14,455	171,524
Poland (including Danzig)	2,632,975	785,498	143,235	12,560	49,084
Norway	2,162,300	----	----	48,972	218,126
Latvia	2,149,167	84,237	22,131	15,217	57,860
France	1,746,039	146,401	40,677	----	----
British India	794,025	30,067	15,441	----	----
Estonia	708,389	----	----	----	----
Czechoslovakia	504,642	----	----	----	----
Rumania	495,267	----	----	----	----
British West Africa	459,857	1,737,532	425,091	----	----
Australia	289,697	3,800	1,080	----	----
French West Africa	270,868	1,139,607	238,286	----	----
Germany	225,528	----	----	261	1,299
Japan	224,620	51,698	12,905	----	----
Irish Free State	145,194	691,796	48,523	12,435	40,445
British Honduras	143,398	263,032	143,398	----	----
Italy	133,021	43,741	10,083	----	----
Newfoundland	124,498	----	----	----	----
Siam	79,585	5,050	2,520	----	----
Philippine Islands and Guam	58,001	----	----	----	----
Yugoslavia	54,777	----	----	----	----
Other foreign	671,677	399,045	177,861	2,825	11,675
Other British	187,647	163,942	66,105	184	3,049
Total	46,496,039	7,660,233	1,699,019	456,665	1,864,938

Countries	Sawn hardwood		Sawn softwood		Dressed lumber		Pit props	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Cubic feet		*Loads*[1]		*Loads*[1]		*Loads*[1]	
Finland	1,098,212	£143,894	1,408,185	£6,141,049	17,667	£99,125	533,914	£1,260,870
Sweden	----	----	925,668	4,379,626	341,575	2,040,404	284,093	698,411
United States	16,755,239	4,406,133	194,138	1,730,303	6,693	89,945	----	----
Russia	34,993	8,525	952,713	4,553,237	280	1,673	133,681	332,786
Canada	4,391,748	688,517	351,928	2,218,135	----	----	----	----
Poland (including Danzig)	704,867	140,867	246,756	1,057,789	----	----	4,825	13,308
Norway	----	----	117,580	621,126	176,646	1,061,484	94,769	232,370
Latvia	----	----	368,146	1,676,532	7,659	47,078	48,411	112,471
France	190,830	61,945	1,225	14,302	----	----	1,231,958	1,551,008
British India	1,722,832	778,584	----	----	----	----	----	----
Estonia	----	----	136,217	580,084	----	----	50,840	108,705
Czechoslovakia	9,847	4,698	105,052	489,070	1,631	10,874	----	----
Rumania	----	----	119,619	495,267	----	----	----	----
British West Africa	147,372	34,766	----	----	----	----	----	----
Australia	1,129,217	274,572	----	----	----	----	----	----
French West Africa	149,387	32,582	----	----	----	----	----	----
Germany	61,921	12,154	15,740	77,153	----	----	43,528	106,379
Japan	529,160	211,715	----	----	----	----	----	----
Irish Free State	205,205	29,423	----	----	----	----	15,414	26,803
Italy	262,919	122,938	----	----	----	----	----	----
Newfoundland	----	----	----	----	----	----	42,870	124,498
Siam	161,962	77,065	----	----	----	----	----	----
Philippine Islands and Guam	237,629	58,001	----	----	----	----	----	----
Yugoslavia	103,209	54,777	----	----	----	----	----	----
Other foreign	523,277	137,770	44,626	228,262	9,343	58,815	19,144	26,945
Other British	227,811	76,251	5,311	30,807	726	9,876	----	----
Total	28,647,637	7,355,177	4,992,904	24,292,742	562,220	3,419,274	2,503,447	4,594,554

---

[1] 1 load equals 50 cubic feet or 600 feet board measure.

Countries	Staves		Ties		Veneers and panels		Other	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Loads [1]		*Loads* [1]		*Loads* [1]			
Finland	31, 162	£129, 883	2, 399	£13, 896	-------	-------	-------	-------
Sweden	35, 335	187, 578	20, 144	92, 083	-------	-------	-------	-------
United States	13, 657	195, 313	36, 193	173, 949	614	£30, 836	-------	-------
Russia	8, 693	92, 028	84, 378	366, 740	50	1, 057	-------	-------
Canada	721	11, 724	51, 521	251, 285	16	779	-------	-------
Poland (including Danzig)	14, 594	202, 304	199, 252	1, 026, 388	-------	-------	-------	-------
Norway	4, 878	29, 194	-------	-------	-------	-------	-------	-------
Latvia	1, 557	32, 074	41, 168	201, 021	-------	-------	-------	-------
France	244	4, 621	2, 127	7, 292	1, 060	53, 664	850	£12, 530
Estonia	-------	-------	4, 459	19, 600	-------	-------	-------	-------
Australia	7	108	1, 238	13, 937	-------	-------	-------	-------
Germany	1, 247	7, 659	1, 763	8, 911	263	11, 973	-------	-------
Other foreign	3, 832	24, 724	6, 617	32, 068	471	19, 747	1, 934	13, 810
Other British	37	399	65	258	4	850	7	52
Total	115, 964	917, 609	451, 324	2, 207, 428	2, 478	118, 906	2, 791	26, 392

[1] 1 load equals 50 cubic feet or 600 feet board measure.

The following table shows the value of unmanufactured wood received in the United Kingdom from the principal countries during 1925 as compared with 1913:

Country	1913	1925
Finland	(1)	£7, 965, 618
Sweden	£4, 596, 854	7, 619, 245
United States	5, 154, 854	7, 405, 047
Russia	13, 739, 746	5, 753, 314
Canada	3, 789, 477	3, 419, 643
Poland	(2)	2, 632, 975
Norway	1, 392, 993	2, 162, 300
Latvia	(1)	2, 149, 167
France	959, 881	1, 746, 039
British India	739, 515	794, 025
Estonia	(1)	708, 389
Czechoslovakia	(3)	504, 642
Rumania	-------	495, 267
British West Africa	423, 301	459, 857
Australia	243, 375	289, 697
French West Africa	344, 294	270, 868
Germany	976, 917	225, 528
Japan	57, 829	224, 620
Irish Free State	(4)	145, 194
British Honduras	135, 340	143, 398
Italy	-------	133, 021
Newfoundland	-------	124, 498
Siam	119, 330	79, 585
Philippine Islands and Guam	-------	58, 001
Yugoslavia	(3)	54, 777
Other foreign	955, 924	671, 677
Other British	159, 254	187, 647
Total	33, 788, 884	46, 496, 039

[1] Included with Russia.
[2] Included partly in Russia and partly in Germany.
[3] Included in other foreign.
[4] Part of the United Kingdom.

DOMINION PARTICIPATION

The British Empire is well provided with forests; but, with the exception of Canada, India, and West Africa, their woods are not marketed in the United Kingdom to any great extent. The reason is that most of them are in the Tropics, where difficulties of manufacture and transportation are very great and where few large stands of any one species are available. Most of them are hardwoods and not suitable for ordinary building purposes, so that a special demand has to be created for them.

Although during the past few years efforts have been made by several prominent import houses to develop a market for Dominion hardwoods, they can not yet have been said to have passed the experimental stage. The Empire Marketing Board, a governmental agency to encourage the purchasing of Empire products by the home market, has also been giving wood attention by means of advertising posters illustrating the various species obtainable from within the British Empire. In spite of all these efforts, however, it is very doubtful if, with the sole exception of Douglas fir, any impression has been made on the import trade. According to official statistics, while the value of the total imports of unmanufactured wood increased 37 per cent from 1913 to 1925, the proportion supplied from the Dominions increased less than 3 per cent.

Douglas fir, however, is in a somewhat different category from other woods. Considerable pressure is being brought to bear on official and semiofficial bodies, such as railroads, dock builders, and municipal authorities, to purchase their requirements of this species within the Empire; and, although no official figures are available, it is the general opinion of those in close touch with the situation that, while imports of this species are undoubtedly increasing, the greater proportion of that increase is being placed with British Columbian exporters.

PRINCIPAL PORTS OF ENTRY

The principal ports of entry in the United Kingdom for lumber are London, Liverpool, Manchester, Hull, West Hartlepool, Cardiff, Glasgow, Grimsby, Newcastle-on-Tyne, Preston, Bristol, and Belfast. Through these ports over 76 per cent of the imports of unmanufactured wood were entered during 1925.

It will be noted from the table on page 50 that certain classes of imports, such as pit props and staves, are limited to a few ports. The reason for this is their proximity to the consuming industries. Railroad ties constitute another item handled through a few ports, these being determined by the facilities for treating either by the railroad companies themselves or firms who specialize in that business.

Of the above-named ports London, Liverpool, Glasgow, Manchester, and Bristol are the most important to the United States export lumber trade.

LONDON

London, the capital of England, is the world's greatest seaport, and during 1925 there entered and cleared vessels having a tonnage of 24,717,055 and 22,347,920, respectively. The ocean trade during the same year was valued at £745,425,872. The city is situated on the River Thames about 50 miles from the seaward limit on the southeast coast. The whole of the dock undertakings are vested in the Port of London Authority, which was established by act of Parliament in 1908 for the purpose of administering, preserving, and improving the port of London.

The Surrey commercial docks are at Rotherhithe, on the south side of the river, and cover an area of 191½ acres of water, 69 acres of which are covered with deep water and 96 with ponds for the storage

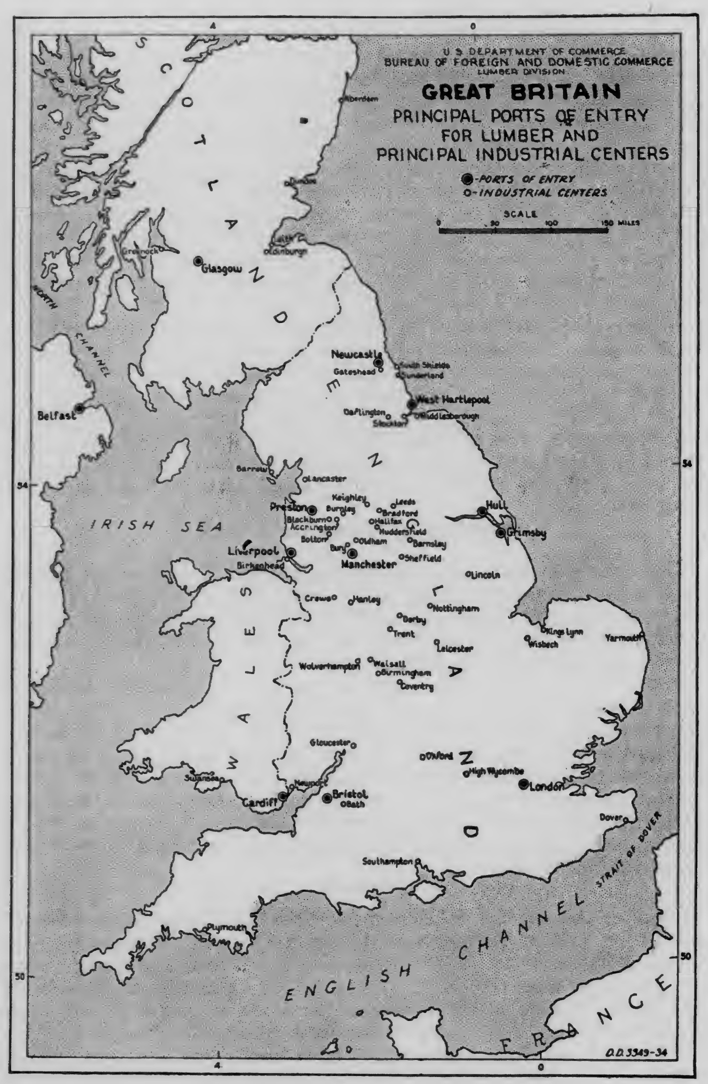


FIG. 9

of timber. At these docks are handled the great bulk of the wood imports to the port of London. The lumber storage grounds are about 57 acres in extent, and sheds with an area of 50 acres are provided for the storage of lumber under cover. In addition to the Surrey commercial docks, wood imports are also handled at the West India and Royal Victoria and Albert Docks. These docks are inconveniently situated and, with the exception of Millwall, have no lumber storage facilities and, for that reason, most importers dislike receiving at them and in many cases they are specifically excluded in contracts.

Methods of delivery.—Wood imports arriving at the port of London are delivered either overside, ex quay, or landed. If overside, no dock dues or charges are paid by the consignees, who make their own arrangements for taking delivery. A great quantity of lumber and timber is delivered overside, and the barging of it to consignees' yards is an important business. When, however, shipments are delivered ex quay or landed certain charges must be paid; a list of the more important, as applying to American woods, will be found in the following paragraphs.

SOFTWOOD

Definition of contents.—For the definition of contents, the following are used:

Petrograd standard	cubic feet	165
Cubic fathom	do	216
Load of round logs	do	40
Load of square timber and lumber	do	50
Mille	pieces	1, 200
Ton	pounds	2, 240

Tariff discounts.—The rates mentioned in the schedules that follow are subject to the discounts shown in the following statement:

	Per cent
Softwood and softwood goods landed:	
Rent charges	2½
All other charges	10
Floated timber: All charges other than rent	10

Quay rates.—When lumber is landed on quays for convenience of discharge and removed within three days of notice of being ready for delivery, the rates shown in the following table, known as quay rates, apply. If, however, it is intermixed with other stock, or if delivery is not taken within the three days, the full "prime" rate is charged. This rate includes wharfage, sorting to dimensions (except where otherwise provided) or to marks in accordance with the specification supplied by the consignees, piling, and delivering.

Description	Thickness	Width	Unit	Quay rate	
	Inches	*Inches*		*s.*	*d.*
Decking	Any	Any	Standard	11	6
Douglas fir, southern pine, Sitka spruce	2 and under 5	Above 6	do	11	6
Do	do	6 and under	do	14	2
Do	Under 2	Above 5½	do	17	3
Do	do	5½ and under	do	18	10
Do	(1)	(1)	do	24	0
Do	5 and up	5 and up	Load	3	11
Do	Under 9	Under 9	do	3	11
Ties	9 and up	9 and up	do	4	2
Do			Ton	6	7
Doors from America			do	3	3
Doors, sorting, if required			Load	6	6
Broom handles, in bundles or cases			1,200 pieces	9	0
Broom handles, loose					

[1] 1 by 5 inches and under or equivalent.

Landed rates.—The following table shows the rates and charges on stock landed both in the open and under cover. These apply to parcels not removed within the period applicable to "quay" rates. There are other rates, known as the "consolidated," applying only to lumber 2 inches and up, under 5 inches in thickness by 6 inches and wider, 6 feet long and up, which include all the charges in the "prime" rate and, in addition, 6 or 12 months' rent, respectively, calculated from the date of landing. However, except to dispose of their stock in less time than the minimum period stated, "consolidated" rates are seldom used, but rather the "prime" rate under which rent is charged on a weekly basis only.

The rates shown in the following table are prime rates, which include wharfage, sorting to size or marks according to specifications supplied by importers, piling, and delivering:

Description and size	Unit	Parcels composed of—										Rent per week	Un-piling or re-piling when re-quired	
		20 standards each and upward or equivalent		15 and under 20 standards each or equivalent		10 and under 15 standards each or equivalent		5 and under 10 standards each or equivalent		Under 5 standards each or equivalent				
LANDED IN OPEN		*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*d.*	*s.*	*d.*
Decking, any width and thickness	Standard	23	6	25	7	27	8	29	9	31	11	4	6	10
Douglas fir, southern pine, and Sitka spruce:														
2 and under 5 inches in thickness, over 6 inches in width.	do	23	6	25	7	27	8	29	9	31	11	4	6	10
2 and under 5 inches in thickness, 6 inches and under in width.	do	28	10	30	11	33	0	35	1	37	3	4	8	5
Under 2 inches in thickness, over 5½ inches in width.	do	35	2	37	3	38	10	40	5	42	7	4	8	5
Under 2 inches in thickness, 5½ inches and under in width.	do	38	3	40	4	41	11	43	6	45	8	4	8	5
1 by 5 inches and under or equivalent.	do	49	4	51	5	53	0	54	7	56	9	4	8	5
5 inches and up in thickness, 5 inches and up in width	Load	8	4	8	10	9	4	9	10	10	11	2	2	1
Ties, under 9 inches in thickness and width.	do	8	4	8	10	9	4	9	10	10	11	2	2	1
LANDED UNDER COVER														
Decking, any width and thickness	Standard	31	11	34	0	36	1	38	2	40	4	5½	6	10
Douglas fir, southern pine, and Sitka spruce:														
2 and under 5 inches in thickness, over 6 inches in width.	do	31	11	34	0	36	1	38	2	40	4	5½	6	10
2 and under 5 inches in thickness, 6 inches and under in width.	do	35	1	37	2	39	3	41	4	43	6	5½	8	5
Under 2 inches in thickness, over 5½ inches in width.	do	41	5	43	6	45	1	46	8	48	10	5½	8	5
Under 2 inches in thickness, 5½ inches and under in width.	do	44	7	46	8	48	3	49	10	52	0	5½	8	5
1 by 5 inches and under or equivalent.	do	55	10	57	11	59	6	61	1	63	3	5½	8	5
5 inches and up in thickness, 5 inches and up in width.	Load	10	6	11	0	11	6	12	0	13	1	2½	2	1
Ties, under 9 inches in width and thickness.	do	10	6	11	0	11	6	12	0	13	1	2½	2	1
Doors, parcels of 50 loads and up	do			13	10							3½	3	2
Doors, under 50 loads	do			17	2							3½	3	2
Floor blocks, in crates or cases	do			10	8							4	2	4
Broom handles, in bundles or cases	do			13	3							3½	2	9

In addition to the ordinary handling and storing charges, there are extra charges for such purposes as weighing doors; sorting and counting loose floor blocks; bundling laths, strips, and squares; measuring, crosscutting of timber and lumber; marking, sticking, and turning over stock for inspection; but they are not of sufficient importance to show them in detail here.

Charges on floated timber.—All floated timber discharged in the Surrey commercial docks is rafted by the port authority and is subject to the rafting charge. At other docks the port authority will, when practicable, allow timber discharged by shipowners into the water to be rafted by the consignees upon payment of 1s. per load as dues, the importers supplying their own material. All timber under 9 inches square is landed on the dock and not into the water.

		s.	d.
Receiving and rafting	per load	5	11
Measuring	do	1	2
Furnishing rafting squares	do		1
Rent	per week	2	2¼

HARDWOOD

Hardwood imports are divided into various classes, namely, furniture woods, dyewoods, teak, and hardwood. It is, however, the first that is of interest to American lumber exporters, as the majority of the woods imported from the United States come under that classification.

Tariff additions.—The rates shown in the following schedules are subject to the following additions:

Rent	7½d. plus 50 per cent.
All other charges	7½d. plus 80 per cent.

Wharfage or quay rate.—This is applied to any parcel of hardwood lumber or planks whether of "furniture" or "hardwood" at the following rates, provided it is removed within three days of notice having been given. Under these rates, weighing, sorting, or measuring are not allowed.

At the quay of the dock of discharge when the importers pay the London clause charges under the American bills of lading, wharfage rate is 3s. per estimated ton weight; and for boards under 1 inch in thickness, small squares, and small pieces, wharfage rate is 4s. per estimated ton weight.

Where the quay services are performed by the docks company[3] or when lightered to the West Indian Dock on quay rate, the wood not having been landed on the quay rate at the dock of discharge (lighterage, if incurred, in addition), quay rate is 5s. per estimated ton weight; boards under 1 inch in thickness, small squares, and small pieces, quay rate is 6s. per estimated ton weight.

Consolidated rates.—The following rates apply to shipments not removed within the period applicable to wharfage or quay rates. These rates include landing, wharfage, and piling, rent for six weeks from date of measurement account if wood is measured and from date of landing account if the wood is not measured, and delivery to land or water conveyances. This rate is generally used by importers who do not remove shipments on "quay" terms.

Furniture woods.—Charges on mahogany, cedar, walnut, hickory, rosewood, ebony, satinwood, bird's-eye maple, ash, oak lumber, sabicu, kauri, and such furniture woods are as shown in the following statement:

---

[3] The docks company does not recognize the 72 hours under the London clause in American bills of lading in connection with the declaration of wood on the quay or wharfage rates.

		s.	d.
In logs	per ton	8	6
In planks, 2 inches and upward	per load	8	6
In boards	do	9	0
In boards, under ¾ inch	do	10	6

Oak logs and planks are charged under "hardwood" rates. Yellow poplar, basswood, cottonwood, and other similar woods, also North Carolina pine boards, are also charged as "furniture" woods, but the landing rate for them is 1s. per load less than those shown above. Boards in secure bundles, 2 inches and upward, and piled in bundles, are charged as planks.

Other charges.—Other charges applying to hardwood lumber are as follows:

		s.	d.
Logs, rummaging or picking out	per ton	1	4
Planks:			
Sticking	per load		8
Measuring	do		6
Rummaging [4]	do	1	9
Boards:			
Sorting for width and thickness [5]	do	1	0
Sorting and piling to lengths [5]	do	1	0
Sorting and piling sizes under ¾ inch [5]	do	2	0
Sorting lengths only in bulk piles under ¾ inch [5]	do	1	0
Sticking	do	1	4
Sticking under ¾ inch	do	2	8
Rummaging [4]	do	1	9
Measuring	do	1	0
Measuring, 1 inch and under per 600 superficial feet	per load	1	6

Squares or small pieces.—Small squares, or loose pieces of oak, ash, or walnut, not exceeding 30 inches in length or 3 inches square, are charged a "consolidated" rate of 36s. per 1,000 squares and pieces, including landing, wharfage, sorting, and piling to sizes, rent for six weeks from date of landing account, and delivery. Rent, 6d. per week per 1,000 pieces.

Small squares delivered immediately from the quay of discharge and which are neither sorted to sizes or piled, will be charged "consolidated" rate, 24s. per 1,000 pieces.

Larger squares, exceeding 30 inches in length and/or 3 inches square, loose or in secure bundles of one size, are charged a "consolidated" rate of 12s. per ton, estimated weight at 50 feet to the ton, with an additional charge according to the labor for any sorting necessary and for piling to sizes. Rent per week, 2d. per ton. When there is a small quantity of loose belonging to a mark or a parcel of bundles of squares, the rate applicable to the bundle is charged.

Rummaging squares, 5s. per 1,000 (loose).

Maple or oak flooring, in sections, in crates, charged as large squares in bundles.

Maple, cedar, or oak blocks or flooring and last blocks in packages from America will be charged under the "Schedule of Rates on American Goods." Rent per week, 3d. per ton.

---

[4] Rummaging is picking out special sizes or lengths from lumber already piled and restacking the pile.
[5] Measuring extra.

Maple blocks or flooring and hickory squares, loose pieces from America:

		s.	d.
Landing, wharfage, piling, and delivery	per load	11	0
Rent	per week		2¼
Birch squares, loose or in bundles:			
Landing, piling, and delivery	per 1,200	17	6
Sorting to sizes	do	2	9
Rent, per week	per 2,240 lbs		2

NOTE.—The rates and charges given are extracted from the regulations and schedule of rates and charges as issued by the Port of London Authority.

CENTER OF IMPORT TRADE

London is the center of the lumber import trade of the United Kingdom, nearly 40 per cent of the total value of all unmanufactured wood during 1925 entering through it. In addition to the very large imports of softwoods required for building, box, and packing-case industries, it is the center of the furniture industry, more than twice as much hardwood lumber being handled through it than any other port in the country. It is also the principal importing center for cooperage, many large breweries being located within its limits. Regular auction sales of mahogany and other tropical hardwoods are held which are attended by buyers from all over Great Britain and also the Continent.

It is naturally the headquarters of the majority of the agency section of the import trade for this market, except Scotland, where the "clannishness" of the Scottish people make them prefer to do business with one of their own nationality. Steamship service is available to London from all ports in the world, and for that reason practically every commercial species of wood can be found in the lumber yards of this city.

LUMBER EXCHANGE

In connection with the London lumber trade, there is operated an exchange which meets every Wednesday afternoon, giving agents, importers, and chartering agents a convenient opportunity of discussing their problems together.

LIVERPOOL

Next in importance as a lumber importing center is Liverpool, situated on the River Mersey in Lancashire. This is the second port in size in the United Kingdom.

The river is fronted for about 6½ miles by a system of docks and basins having a water area of 430 acres and a lineal quayage of over 27 miles. Birkenhead, on the Cheshire side of the river, has in addition docks having a water area of over 170 acres and over 9 miles of quayage. The whole dock system, both in Liverpool proper and in Birkenhead, are under the jurisdiction and management of the Mersey Docks and Harbor Board.

DUES, HANDLING CHARGES, AND RENT

In this section are given schedules of dock dues and handling charges, which are subject to a discount of 5 per cent, that master porters, or stevedores, are authorized to make on the principal wood items of interest to American lumber exporters, according to the by-laws of the Mersey Dock and Harbor Board. There are also shown the rates of rent fixed for goods stored on the property of the said board. However, most of the wood entering through the port of Liverpool is stored in private yards belonging to the various importers and agents.

Dues.—The dock dues on these items at the port of Liverpool are as follows:

		s.	d.
All wood in the log, round or square, hewn or sawn, dressed or partly dressed (other than masts or furniture and fancy woods), and fir and pine exceeding 4 inches in diameter; flitches; oak, teak, ash, beech, birch, gum, hickory, yellow poplar, and other hardwood planks; all rough round spars, unbarked or undressed	load	2	0
Masts and fir and pine exceeding 4 inches in diameter	do	2	0
All spars (other than lancewood) 22 feet and upward, under 4 inches in diameter	120 pieces	5	8
All spars (other than lancewood) under 22 feet long and under 4 inches in diameter	120 pieces	2	6
Railway ties and blocks, other than hardwood	load		10
Oars, oar rafters, boat hooks, and handspikes	120 pieces		6
Hubs	1,200 pieces	2	8
Wedges, wheel spokes, and fellies	do	2	8
Staves	2,240 pounds		6
Batten and batten ends of birch, pine, spruce, southern pine, and hemlock, not exceeding 4 inches in thickness	Petrograd standard	2	6
Batten and batten ends of all other descriptions of wood and all batten and batten ends exceeding 4 inches in thickness	load	2	0
Deals, planks, scantlings, boards, and ends (other than batten ends) of birch, pine, spruce, and southern pine, not exceeding 4 inches in thickness	Petrograd standard	2	6
Doors, loose	20 pieces	1	9
Maple blocks and rough shaped maple rollers	2,240 pounds	1	6
Other maple and poplar not being used as furniture or fancy wood is charged as "wood, not otherwise rated"	load	2	0
Furniture and fancy woods:			
Cedar, Honduras mahogany, walnut planks and burs (Black Sea only—America pays the rate for "all timber in the log"), etc	2,240 pounds	2	8
Mahogany of all descriptions, except Honduras	do	2	0
Persimmon and dogwood	do	2	0
All other furniture, fancy and turnery woods, and lancewood	do	3	0
Woodware or woodwork	do	4	0

A "load" is to be taken as 50 cubic feet of King's caliper measure or extreme measure.

The following is a list of the principal kinds of wood that come under the respective rates shown in the foregoing schedule (all wood in the log, round or square, hewn or sawn, dressed or undressed): Ash, bass, beech, birch, elm, fir, greenheart, gum, hickory billets, hickory shafts, hickory, juniper, locust, oak, pine, southern pine, poplar, sabicu, spruce, tamarack, teak, oak wainscot logs, oak wainscot billets, walnut, and yellow poplar.

Flitches are pieces of wood varying from 5 to 9 inches in thickness.

Furniture, fancy, and turnery woods include alder, boxwood, cherry, cocobolo, ebony, holly, cocus, lignum-vitae, lancewood, partridge, pear, purple, quebracho, rose, sandal, satinwood, and zapatero.

Handling charges.—The following is the schedule of charges master porters or stevedores are authorized to make, according to the by-laws of the Mersey Dock and Harbor Board on the principal wood items of interest to American lumber exporters:

Class	Receiving, stowing on quay, and counting (consignees loading off)	Delivered after having been stowed on quay [1]
LOGS AND TIMBER [2]		
	Pence	*Pence*
California redwood, gum (red, black, and tupelo), magnolia, Douglas fir, yellow poplar, southern pine, spruce, western pine, ash, beech, birch, elm, hickory, maple, oak, sycamore, and walnut other than African and Black Sea, load of 50 cubic feet	35	
Mahogany, cedar, walnut, and other furniture woods from Africa and Black Sea walnut, 2,240 pounds [3]		52. 5
Mahogany, a total quantity of 1,000 tons upward in any one cargo dealt with within the limits of the ship's berth, 2,240 pounds		40. 0
Spruce, pine, and fir of all descriptions; deals, scantlings, and battens, 2 inches and up thick, 5 inches and up wide, and 9 feet and up long, standard	84	
Scantlings, 4 by 4 inches and under, boards under 2 inches in thickness, deal ends under 9 feet long, standard	98	
California white and sugar pine, cypress, Port Orford cedar, Sitka spruce, United States white pine, western pine, standard	84	
California redwood, North Carolina pine, Douglas fir, southern pine, standard	95. 5	
Ash, beech, birch, cherry, hickory, pieces under 1 inch in thickness	48	
Mahogany, maple, oak, walnut, pieces 1 inch in thickness	42	
Basswood, cedar, chestnut, cottonwood, gum (red, sap, black, and tupelo), yellow poplar, sycamore, and willow, pieces over 1 inch in thickness	36	
SMALL ROUND LOGS OR PART LOGS OF THE UNDERMENTIONED SPECIES		
Lignum-vitae, partridgewood, persimmon, rosewood, sabicu, Black Sea walnut, and zapatero, 2,240 pounds		[4] 46. 5
Boxwood, cocobolo, cocus, pencil cedar, dogwood, ebony, kingwood, lancewood, pearwood, sandalwood, satinwood, snakewood, tulipwood, 2,240 pounds		[4] 49. 0
WOOD GOODS IN BUNDLES [5]		
Ash, birch, hickory, maple, oak, gum, and walnut square; rime, spool wood, 2,240 pounds		[4] 54. 5
Broom handles, 2,240 pounds		[4] 48. 5
Wood handles, including ash stems, ash and hickory shunting poles, round or square, 2,240 pounds		[4] 48. 5
Wood handles with D's,[5] 2,240 pounds		[6] 57. 75
Wood dowels, 2,240 pounds		[4] 60. 5
Box boards (weight to be computed on basis of 2¼ long tons per standard), 2,240 pounds		[7] 53. 25
Maple flooring blocks, 2,240 pounds		[4] 48. 5
Ply wood of all descriptions:		
Packages weighing 5 hundredweight (560 pounds) and under 20 hundredweight (2,240 pounds) 2,240 pounds		[4] 37. 0
Packages weighing 4 hundredweight (448 pounds) and under 5 hundredweight (560 pounds), 2,240 pounds		[4] 39. 75
Packages weighing 3 hundredweight (336 pounds) and under 4 hundredweight (448 pounds), 2,240 pounds		[4] 42. 5
Packages weighing 2 hundredweight (224 pounds) and under 3 hundredweight (336 pounds), 2,240 pounds		[4] 48. 0
Packages weighing 1 hundredweight (112 pounds) and under 2 hundredweight (224 pounds), 2,240 pound		[4] 52. 25
Packages weighing 56 pounds and under 1 hundredweight (112 pounds), 2,240 pounds		[4] 71. 5
Packages weighing under 56 pounds, 2,240 pounds		[4] 82. 5

[1] The rates given under this heading include all the charges shown in the first column but, in accordance with an arrangement made between the Liverpool Timber Trade Association and master porters, the latter have the right in these cases to do the outward loading for the consignees.

[2] The foregoing rates do not affect any existing custom of dealing with entire cargoes of lumber and/or timber.

[3] Including weighing on quay or over weighing machine.

[4] The rate includes weighing over a machine.

[5] When the handles are wrapped in canvas a deduction of 10 per cent is to be made from the above-mentioned rates. Should any square 4 inches and up be shipped loose in a shipment of other sized squares in bundles, the same to be charged as squares in bundles.

[6] The rate includes weighing for average only.

[7] The rate is exclusive of weighing.

Class	Receiving, stowing on quay, and counting (consignees loading off)	Delivered after having been stowed on quay
COOPERAGE [8]		
Rough staves—pipe, wine pipe, puncheon, hogshead, barrel, or keg, 2,240 pounds	----------	45.25
Dry cask or flour barrel in bundles of 50 pieces, 2,240 pounds	----------	77.0
Dolly tub and oil barrel, loose, 2,240 pounds	----------	81.0
Barrel headings in bundles, 2,240 pounds	----------	77
Heads (complete) in bundles, 2,240 pounds Hoops, Canadian and American, 2,240 pounds Sawn in bundles, 2,240 pounds	----------	36.25
Shooks, 2,240 pounds	----------	63
SUNDRY ITEMS NOT OTHERWISE PROVIDED FOR		
Last blocks and walnut blocks for gun stocks, loose, 2,240 pounds	----------	[9] 54.5
Maple flooring, blocks, loose, 2,240 pounds	----------	[9] 60.5
Oars and poles (turned), loose or in bundles, 2,240 pounds	----------	[9] 48.5
Spokes, loose, 2,240 pounds	----------	[9] 45.25
Wood rollers for wringing machines, 2,240 pounds	----------	[9] 54.5
Doors, wooden, 2,240 pounds	[10] 95.0	----------

[8] All the above rates include counting and weighing over a machine.
[9] Includes counting and weighing over a machine.
[10] Exclusive of weighing.

Rent.—Goods landed on the quay and not removed before 5 o'clock in the afternoon of the third working day next after the day on which the same were so landed are liable to quay rent at the rate of 5s. per hour for the first following 24 hours and 10s. per hour afterwards. At the discretion of the board, however, goods may be allowed to remain on the quays beyond the time when they become due for removal therefrom on payment of special rent, if, in their opinion, no obstruction to business will be caused thereby.

The rates fixed for special rent in Liverpool are as follows:

In sheds or on open quay, ½d. per square yard for each 24 hours or any portion thereof except in the case of timber.

Timber on the upper timber quay and the casual storage ground at the north side of the Hornby Dock, ¼d. per square yard per week.

On Muspratts Land, Seaforth, 1d. per square yard per week.

The lumber trade.—Next in importance to London as a wood-importing center is Liverpool. Many agents make their headquarters here, and those whose head offices are in London generally maintain a branch in this city. These offices not only cover Liverpool, Manchester, and the West Coast generally from the Bristol Channel to Barrow-in-Furness, but Ireland as well, daily overnight steamship services operating to both Dublin and Belfast.

Liverpool is the center of the African mahogany trade, regular auctions being held which draw buyers from all parts of Great Britain. It is also the center of the palm-oil barrel industry, the barrels being principally made in this city and shipped to the west coast of Africa in the form of shooks. Large quantities of cooperage for flour and glucose barrels also enter through this port.

In addition to supplying the needs of the local industries, Liverpool acts as a center from which lumber is distributed throughout the thickly populated industrial centers of Lancashire, Cheshire (Birkenhead), and the Midlands. Among these industries may be mentioned furniture, shipbuilding, coal mining, textile, box and packing case, and railroad-car building.

Lumber exchange.—Like London, the Liverpool lumber trade also operates an exchange for the convenience of its members and out-of-town members.

Birkenhead.—This port, which is included in the Liverpool customs district, is the home of an important shipbuilding industry, there being no yards in Liverpool itself. Likewise, although Liverpool is also credited with large imports of railroad ties, all of these go to Birkenhead, where an important creosoting industry is located.

HULL

Hull, situated on the north bank of the River Humber, is the chief wood-importing center on the east coast of Great Britain. Through it enter the wood needs of the industrial cities of Yorkshire and the Midlands. It is, however, of comparatively small importance to American lumber exporters, its main business being in north European softwoods. It is a convenient center for wood agents from which to cover the east coast of England, and several maintain either offices or branch offices in this city. Trade in Pacific coast lumber and doors has also been somewhat handicapped by the absence of regular sailings from that section of the United States, but if this is remedied it is probable that business will materially increase.

The city itself has many industries, chief of which are shipbuilding, oil refining (edible), tanning, sugar refining, chemicals, and machinery. It is also the headquarters of the North Sea fishing fleet and the great entrepôt for the oversea trade with Germany and the Scandinavian countries. The chief exports are woolen and cotton goods, coal, and chemicals.

All of the docks are the property of the London & North Eastern Railway Co. and cover a total area of 236 acres, with a river frontage of over 7 miles.

MANCHESTER

Manchester, or "Cottonopolis," as it is often called, is the headquarters of the Lancashire cotton industry. Direct communication is possible for the largest ocean vessels through the Manchester Ship Canal, 35½ miles in length, in which a depth of 28 feet is maintained. The entrance to the canal is at Eastham, 19 miles from the bar at the mouth of the Mersey.

The Manchester dock estate covers an area of 406½ acres, including water space of 120 acres and quays 5⅝ miles in length, and is completely equipped with 85 miles of railroad, grain elevators, cold-storage plants, and warehouses. Goods are conveyed in freight cars between loading and discharging berths at the docks or elsewhere on the canal and are connected with trunk lines that enable delivery to be made anywhere in Great Britain.

In addition to being the center of the cotton industry, Manchester is one of the leading furniture manufacturing centers of the country, and an important market for American hardwoods used in the Lancashire textile industry.

The manufacture of packing cases for the export trade in cotton goods, also textile and other machinery, is another important industry consuming large quantities of lumber.

WEST HARTLEPOOL

Although during 1925, based on value of imports, West Hartlepool ranked fifth in British lumber ports, this position was chiefly gained by the large imports of pit props for the Durham coal field. Nearly 50 per cent of the total value of the imports of unmanufactured wood was represented by this item alone. In addition, there are important local shipbuilding, cement, and paper industries.

The principal exports are coal and iron, while large quantities of fish are landed from the North Sea fishing grounds. Outside of the mining, shipbuilding, and house-building industries, there is little demand for lumber and comparatively small quantities of American stock enter through this port.

CARDIFF

Cardiff, with Barry and Penarth, which are included, is the most important port in Wales. There is extensive dock accommodation, covering 165 acres, capable of accommodating the largest type of cargo vessels and timber storage ponds. It is probably the greatest coal port in the world, being the main outlet for the output of the South Wales coal field.

In addition to large quantities of pit props, almost entirely from France, which amounted to over 60 per cent of the value of the total wood imports in 1926, it is also an important market for southern pine used in the mines and for dock repair work. A fair amount of American hardwoods for the local furniture industry is also imported.

GLASGOW

Glasgow, the industrial and commercial capital of Scotland, has a population of about 1,034,000, and is situated on the River Clyde. It is the greatest shipbuilding center in the world. The banks of this river are lined with shipyards and engineering works, and upon the activity in these industries largely depends its prosperity. Other important industries include the manufacture of steam tubes, boilers, locomotives, textile and other machinery, chemicals, distilling, and furniture.

Next to London and Liverpool, it is probably the most important market for American lumber, large quantities of both southern and northern hardwoods, southern pine, Douglas fir, and Port Orford cedar being handled by its importers.

Owing, however, to the depression in shipbuilding that has existed since 1920, the demand for American woods has been greatly curtailed, but with the revival of that industry in 1926 an improvement took place which still continues.

Most of the Scottish lumber agents have their offices in Glasgow, some of them acting as subagents for London or Liverpool firms.

It is not usual to bring timber up to Glasgow itself, but it is discharged at Greenock, near the mouth of the Clyde, where storage ponds are provided and deliveries made when required.

GRIMSBY

Grimsby is the largest fishing port in the British Isles, with dock accommodation of over 350 acres for that trade. It is situated on the River Humber, about 15 miles south of Hull, the docks being owned by the London & North Eastern Railway.

LIBRARY SCHOOL OF BUSINESS

Grimsby, however, is of little importance to American lumber exporters, most of the trade being in north European softwoods for general housing, pit props for the South Yorkshire mining industry, and railroad ties.

NEWCASTLE-ON-TYNE

Next to the Clyde, this city is the most important shipbuilding center in the United Kingdom. Not only are commercial vessels built here but many battleships also. Newcastle is the center of the Northumberland and Durham coal industry, the export of which forms an important part of its trade. It is, however, as a market for shipbuilding woods that it is of most interest to American lumber exporters and upon the activity in that industry largely depends the demand for southern pine and Douglas fir.

Newcastle is also the headquarters of several old established wood agency firms, and some London houses maintain branch offices to cover the east coast import trade here.

PRESTON

Preston, in Lancashire, is about 28 miles north of Liverpool and is a distributing center for building and packing-case lumber used in the industrial cities of middle and North Lancashire.

The city itself has large cotton mills and is an important spinning center. It is, however, of no importance as an outlet for American lumber, such supplies as are needed being purchased from Liverpool or Manchester importers.

BRISTOL

Bristol is the leading port of the southwest of England and does a large foreign trade. It was from this port that the first regular trans-Atlantic steamship service was established.

As a tobacco port it is of great importance, large factories being located here. Another important local industry is the manufacture of chocolate candy, one of the leading British firms having its factory here. Other important industries include oil seed and cake and chemicals.

Bristol city itself is on the River Avon about 6½ miles above its junction with the Severn. Owing, however, to insufficient depth of water, large ocean vessels are unable to enter the city docks but discharge at Avonmouth. These docks are on the estuary of the Severn on the north side of the River Avon, about 6 miles northwest of Bristol, and most of the lumber received from the United States is discharged at them. All of these docks belong to and are operated and maintained by the docks committee of the corporation of Bristol, known as the Port of Bristol Authority.

As a market for hardwoods Bristol is of particular interest to American lumber exporters, hardwood being imported not only for local consumption but for distribution throughout the southwest of England. Many importers from other parts of the country maintain stocks here. While one important wood agency maintains an office in Bristol, the import trade is usually covered by salesmen working from headquarters at either London or Liverpool.

The port is well supplied with steamship connections, regular services being maintained to all the lumber-producing countries, including the United States. (Bristol Channel port charges, effective April, 1928, appear in the appendix of this report.)

BELFAST

Belfast, the capital of Northern Ireland, is situated on Belfast Lough, an arm of the Irish Sea, about 15 miles from its entrance. It has extensive shipyards, some of the largest vessels in the world having been built here. In addition to shipbuilding, it is the center of the Irish linen industry.

The shipbuilding industry is the principal outlet for American wood, the demand largely depending upon the activity of that industry. The linen industry is also an important consumer of American woods, principally red cypress and maple, but, owing to competition from other fabrics, it has suffered from great depression since the war.

In addition to goods for local consumption, most of the North of Ireland's oversea trade passes through Belfast, large quantities of foodstuffs and tobacco being exported to England, while practically the entire supplies of coal must be imported.

Belfast is also the seat of the lumber import trade, it being the headquarters of agents who cover not only the North of Ireland but the Free State as well from that city; there are also English agents that sell in Ireland.

IMPORTS BY PORTS

The following table shows the wood imports of the United Kingdom, by principal ports of entry, during the year 1925:

Port	Round and hewn hardwood		Round and hewn softwood		Sawn lumber, hardwood	
	Quantity	Value	Quantity	Value	Quantity	Value
	Cubic feet		*Loads* [1]		*Cubic feet*	
London (including Leigh, Queenboro, and Rochford)	3, 144, 353	£762, 001	122, 181	£404, 753	13, 640, 878	£3, 750, 005
Liverpool (including Birkenhead and Garston)	3, 005, 135	632, 578	39, 488	250, 233	6, 172, 553	1, 510, 641
Hull (including Keadby)	----------	----------	59, 700	189, 807	----------	----------
Manchester (including Ellesmere Port, Partington, Runcorn, and Warrington)	221, 184	53, 157	54, 501	217, 174	1, 393, 275	298, 717
West Hartlepool	----------	----------	2, 671	18, 924	----------	----------
Cardiff (including Barry and Penarth)	----------	----------	4, 027	23, 045	227, 862	52, 703
Glasgow	300, 439	46, 464	----------	----------	2, 933, 551	926, 171
Grimsby (including Immingham)	----------	----------	5, 304	19, 199	----------	----------
Newcastle (including North and South Shields)	----------	----------	14, 687	96, 651	----------	----------
Preston	----------	----------	----------	----------	----------	----------
Bristol (including Avonmouth, Portishead, and Weston Super Mare)	----------	----------	----------	----------	758, 653	179, 894
Belfast	----------	----------	----------	----------	145, 571	49, 091
Total	----------	1, 494, 200	----------	1, 219, 786	----------	6, 767, 222

Port	Sawn lumber, softwood		Dressed lumber, softwood		Pit props	
	Quantity	Value	Quantity	Value	Quantity	Value
	Loads [1]		*Loads* [1]		*Loads* [1]	
London (including Leigh, Queenboro, and Rochford)	1, 479, 689	£7, 111, 648	219, 253	£1, 293, 396	----------	----------
Liverpool (including Birkenhead and Garston)	253, 224	2, 110, 732	44, 352	279, 638	----------	----------
Hull (including Keadby)	596, 218	2, 605, 490	24, 434	134, 932	154, 200	£378, 439
Manchester (including Ellesmere Port, Partington, Runcorn, and Warrington)	387, 740	1, 901, 378	48, 427	304, 286	----------	----------
West Hartlepool	204, 958	902, 897	1, 247	7, 908	419, 440	1, 041, 450
Cardiff (including Barry and Penarth)	115, 743	540, 787	12, 659	75, 162	779, 546	1, 162, 736
Glasgow	82, 659	576, 145	3, 219	31, 026	----------	----------
Grimsby (including Immingham)	191, 212	832, 824	1, 398	8, 895	39, 799	96, 195
Newcastle (including North and South Shields)	101, 800	551, 299	20, 576	130, 051	144, 338	325, 497
Preston	113, 610	530, 197	44, 010	265, 007	14	23
Bristol (including Avonmouth, Portishead, and Weston Super Mare)	89, 266	450, 446	18, 589	118, 669	----------	----------
Belfast	90, 791	463, 567	8, 686	57, 839	----------	----------
Total	----------	18, 577, 410	----------	2, 706, 809	----------	3, 004, 340

---

[1] 1 load equals 50 cubic feet, or 600 feet board measure.

Port	Staves		Ties		Total value
	Quantity	Value	Quantity	Value	
	Loads [1]		*Loads* [1]		
London (including Leigh, Queenboro, and Rochford)	28, 356	£230, 673	76, 781	£386, 708	£13, 939, 184
Liverpool (including Birkenhead and Garston)	17, 277	167, 808	80, 771	409, 046	5, 360, 676
Hull (including Keadby)	----------	----------	----------	----------	3, 308, 668
Manchester (including Ellesmere Port, Partington, Runcorn, and Warrington)	1, 632	22, 414	----------	----------	2, 797, 126
West Hartlepool	----------	----------	26, 545	125, 053	2, 096, 232
Cardiff (including Barry and Penarth)	10, 383	47, 653	----------	----------	1, 902, 086
Glasgow	4, 150	67, 259	----------	----------	1, 647, 065
Grimsby (including Immingham)	----------	----------	69, 303	322, 723	1, 279, 836
Newcastle (including North and South Shields)	7, 763	29, 030	----------	----------	1, 132, 528
Preston	----------	----------	----------	----------	795, 227
Bristol (including Avonmouth, Portishead, and Weston Super Mare)	----------	----------	----------	----------	749, 009
Belfast	----------	----------	----------	----------	570, 497
Total	----------	564, 837	----------	1, 243, 530	35, 578, 134

---

[1] 1 load equals 50 cubic feet, or 600 feet board measure.

FACTORS IN IMPORT TRADE

In order for a lumber exporter to be successful in the British market it is essential that he familiarize himself with the principal factors entering into the import trade of that country. A brief résumé of these is given, but it is intended to furnish merely guideposts and not a complete exposition of the subjects discussed. While the information given applies equally to all countries shipping to the United Kingdom, it is given with the United States trade particularly in view.

AGENTS

With the exception of a small volume which is taken by the very few direct importers and that sold direct by foreign shippers through their own branch houses, the British lumber import trade is done entirely through the medium of agents acting as sales representatives for the foreign shippers.

Not only do they act as sales representatives but they also carry the del credere—in other words, they guarantee the solvency of the buyer and, what is also of importance, advise their shippers on market conditions to enable them to dispose of their stocks to the best advantage. It will thus be readily understood that they occupy an exceedingly strong position and have long been recognized as performing valuable services without which the import trade would have difficulty in functioning.

London, Liverpool, Glasgow, Belfast, and to a small extent, Newcastle-on-Tyne, Hull, and Bristol, are the principal cities in which lumber agents make their headquarters. Most of the larger English firms maintain offices in both London and Liverpool, the most important markets, and cover the entire country from those centers. On the other hand, some cover certain territories, such as the northeast coast, through subagents, while occasionally a branch office will be established, but the overhead expense of this is hardly justified unless a large business is done.

Glasgow is a separate entity, buyers in the Scottish market preferring to deal with one of their own kind, and English agents frequently employ subagents to cover Scotland.

Belfast wood agents cover both Northern Ireland and the Irish Free State. In addition, there are one or two agents in Dublin. Liverpool agents also cover this territory, the principal importing centers being reached overnight from that city.

There are about 75 agency firms in the United Kingdom; not all, however, handle American lumber, many dealing exclusively in European softwoods.

Selecting an agent.—It would hardly seem necessary to advise American lumber firms contemplating doing business in the United Kingdom that the greatest care should be taken in selecting an agent. Apart from the financial standing, which naturally should be investigated through one's bankers or some agency specializing in foreign credits, such matters as the competing lines (particularly American) the prospective agent carries, the facilities he has to cover adequately the proposed territory, and his standing in the trade itself should all receive careful consideration.

As regards the territory to be covered in the agency agreement it is important that, unless the firm under consideration maintains offices in both London and Liverpool, they should not be given the whole of England and Wales, but a separate agent appointed in each city. The import trade is so extensive in both of them that it requires a separate office to take care of it and can not adequately be covered by periodic visits of a traveling salesman, and should the attempt be made either one or the other will be neglected.

Should separate agents be appointed, it is essential that the territory covered by each should be clearly defined, such as which is to cover the Bristol Channel and South Wales districts, also that part of England lying between Hull and Newcastle-on-Tyne, both included. It is immaterial to which it is given as both can readily be covered from either London or Liverpool.

A separate agent should be appointed by all means for Scotland, which is an important market for both American hardwoods and softwoods. Many substantial and old-established agency houses are located in Glasgow, the industrial center of the country.

The Irish Free State and Northern Ireland are covered principally by Belfast and Liverpool agents, some of the former acting on a subagency basis. While under ordinary circumstances it is preferable to appoint a local firm as agent, Belfast occupies a rather different position. The market is comparatively limited, and most agents in that territory are already representing so many shippers that American exporters may obtain better results through a Liverpool house. This, however, is a matter that each exporter must decide for himself, as naturally much depends upon the variety of wood involved.

Agency agreements.—The best north European shippers seldom change their agents in Great Britain and, as a rule, continue their connections from year to year. This business is largely standardized, there being little difference between the stock of any first-class shippers, and all their brands are well known to the British import trade. While north European lumber constitutes by far the greater part of the import trade, there has been a great increase in that received from Poland and central Europe since the war.

An American exporter entering the British lumber market for the first time should be careful not to tie himself up with a long-time agreement. It must be remembered that, while his investigations point to a satisfactory business being done, only the test of time can furnish the proof. The shipper has, after all, comparatively little actual knowledge on which to base this assumption, and the agent is equally ignorant of the shipper. It is therefore best that, to start off with, a tentative agreement be made for a period of, say, not exceeding six months, and if at the end of that time relations have proved satisfactory, a contract for a longer period can be made.

Another important point is that the shipper is protected from getting tied up with an agent who may wish to prevent competition with his existing connections and makes as many agency agreements as possible without having any idea of pushing their sales. Instances have been known, although fortunately rare in Great Britain, where shippers have made a long-time contract and, too late, discovered the agent was selling for their chief competitor in that market, but they were helpless to remedy the situation which would have caused little harm if a trial period had been made in the first instance. Once the trial period is over, however, it is advisable to give the agent an opportunity to develop the business and not, if orders do not materialize as rapidly as anticipated, make a change. The British are conservative buyers, and it takes time for a new shipper to get established, but this national characteristic has its advantages as, once their custom is gained, it takes a lot to dislodge it.

METHODS AND TERMS OF SALE

American lumber.—Both hardwoods and softwoods are sold on a c. i. f. basis in quantities of one carload (when no specified quantity is stated a car is 15 M feet, board measure, with 10 per cent more or less), or multiples thereof. The usual terms are for the shipper to draw direct on his agents at three or five days' sight for an agreed amount, varying from 75 to 100 per cent of the c. i. f. invoice value, less freight, commission, del credere, and discount. The usual terms are 4 or 5 per cent commission and del credere, together with 2½ per cent discount, based on the c. i. f. value on hardwoods and f. o. b. if softwoods. A full and complete set of documents, including invoice, specification, bill of lading, and policy of insurance (in practice a certificate of insurance is allowed for in the contract) being attached to the draft, which is discounted at the shipper's bank, the balance of the invoice being remitted after arrival and acceptance of the goods by the buyer. Sometimes, but very occasionally, the draft may be drawn direct on the buyer, but in any event the agents carry the del credere.

North European lumber.—This is largely sold in full-cargo lots either f. o. b. loading port, the buyer assuming the risk of chartering and insurance, or c. i. f. In the early part of the buying season f. o. b. contracts are more usual, but later c. i. f. contracts become frequent and the balance is even. The practice of selling on a c. i. f. basis is influenced largely by the desire of exporters to take advantage of favorable tonnage offers, particularly toward the end of the shipping season, when the ports are liable to become ice-bound and remaining stocks necessarily carried over the winter if the opportunity of loading is missed.

The selling season for north European lumber usually opens about September or October, when the shippers forward stock and price lists to their agents covering the lumber they have to offer for delivery during the ensuing season. These prices are for "first open water" delivery (the ports being frozen during the winter months), which usually takes place in April or May of the following year, depending upon the early or late arrival of spring. British importers naturally desire to get the earliest possible loading so as to obtain the benefit of the landed prices, usually at their peak at the end of the winter season just before the new one opens, and there is keen competition as to whose cargoes shall be among the first arrivals.

The usual terms of sale are cash in exchange for documents, less 2½ per cent discount, together with 1 to 2½ per cent commisson, according to whether the del credere risk is taken, both computed on the f. o. b. value. However, shippers do not always require their British agents to assume the del credere risk but carry it themselves; in such cases the principals are declared.

Russian lumber.—All sales of Russian lumber are on a c. i. f. basis and are handled by various British agents acting as sales representatives of the central trust, known as the "Exportless," acting on behalf of the Soviet Government, on the usual terms as applying to other north European lumber, the agents carrying the del credere risk.

Eastern and central European lumber.—Sales of lumber from Poland, Latvia, Estonia, Lithuania, Rumania, Czechoslovakia, and Yugoslavia are also handled on a c. i. f. basis and on similar terms to the north European lumber, except that the agents always carry the del credere risk.

QUOTATIONS

With the exception of American hardwood lumber, which may be either in dollars or sterling (although since the war the former is more prevalent), it is customary for quotations in the import trade to be in British currency. The unit of sale, however, varies according to the group or division to which the particular species belongs, the principal ones being as follows:

FANCY HARDWOODS

Satinwood:
  East Indian, St. Domingo, and Porto Rico, per board foot.
  Jamaica, per ton of 2,240 pounds.
Partridgewood, rosewood, lignum-vitae, ebony, zapatera wood, cocuswood, boxwood, snakewood, Black Sea walnut, and African padouk, per ton of 2,240 pounds.
Padouk (East Indian), and sabicu, per cubic foot.

HARDWOODS

Logs: Ash, hickory, poplar, oak, American walnut, birch, per cubic foot, Hoppus measure.
Timber:
  Mahogany, Spanish cedar, African whitewood (obeche), and African walnut, per superficial foot, brokers' measure.
  Italian and French walnut, per superficial foot.
  Oak and elm, per cubic foot.
  Teak and greenheart, per load[1] of 50 cubic feet.
Lumber:
  All varieties over 1 inch in thickness, per cubic foot, or dollars per thousand feet board measure, if from the United States.
  1 inch and under in thickness, per superficial foot, or thousand superficial feet, if from the United States.

SOFTWOODS

Timber, per load[6] of 50 cubic feet or Petrograd standard of 1,980 feet board measure.
Lumber, per Petrograd standard.
Miscellaneous:
  Poles, per linear foot.
  Ties, each.
  Pit props, per fathom, 6 by 6 by 6 feet, measured over all as the timber is piled on the wharf, or per Goteborg scale standard.

CONTRACTS

The forms of contract used in the import trade have largely been standardized as the result of negotiations between the Timber Trades Federation and the various shippers' organizations.

There are certain circumstances, however, under which agents prefer to use their own form of contract or else add special clauses to cover individual cases.

European softwoods.—The standard forms of contracts used for softwood lumber imports from the north European countries are known as the "Uniform" for f. o. b. sales and "Albion" for c. i. f. sales. The entire softwood business with these countries is done on either one or the other. Russian sales are made on the "Russian wood goods" form of contract, while for Poland, central European, and other countries a plain form filled up as required is generally used.

The text of the "Uniform" or f. o. b. form and the "Albion" or c. i. f. form of contracts follow:

Code Name: "UNIFORM"

CONTRACT

(F. o. b. Form)

Adopted by the Timber Trade Federation of the United Kingdom, the Swedish Wood Export Association, and the Finnish Sawmillers' Association, 1912

________________________, 19__

Sold to ____
Bought of ____
through the medium of sellers' agents, the wood goods hereinafter specified, subject to a variation "in shipper's option" of 10 per cent more or less on any or

---

[6] In early days in England timber was usually hauled in "tuggas" or wagons drawn by several pairs of horses or oxen, relieved in frequent relays. The ordinary timber wagon could carry a good-sized log, weighing somewhat over a ton. The term "load," which became the standard of measurement, arose from this source, according to Prof. Robert G. Albion, in "Forests and Sea Power."

every item, but not exceeding 20 standards on any one item, always provided that the total quantity is not varied except under the provisions of clause 5. Items of 2 to 10 standards may be varied to the extent of 1 standard. In the event of overshipment of any item, buyers are not compelled to accept or pay for anything beyond the quantity and margin stated in the contract. In the event of undershipment of any item, buyers are to accept or pay for the quantity shipped, but have the right to claim compensation for the quantity short-shipped. Each item of this contract to be considered a separate interest.

To be loaded at ---------- and to be ready for shipment ----------

Other conditions as specified on the back.

SPECIFICATION

CONDITIONS

1. The prices are in British sterling: Sawn goods per St. Petersburg standard of 165 cubic feet; planed goods per St. Petersburg standard of 165 cubic feet (nominal measure); hewn goods per load of 50 cubic feet (customs' caliper measure, excepting Upper Gulf hewn balks); firewood per fathom of 216 feet cube. All free alongside the ship.

2. Sellers undertake to supply sufficient ends, 6 to 8 feet, for broken stowage only, at two-thirds price, but not exceeding 5 per cent of the cargo unless otherwise agreed. Such ends to be regarded as included in the quantities named below, but to be disregarded in the calculation of average length. Shippers to have the right to supply up to the said 5 per cent of ends at two-thirds price, whether required for broken stowage or not.

3. The goods are to be properly seasoned for shipment to ---------- and shall be of the shippers' usual bracking, average length and fair specification for such description of goods, and delivered to the ship in accordance with the custom of the port, the sellers not being responsible for any deterioration occasioned by circumstances beyond their control after the goods have left shippers' wharf properly protected.

4. Ship room to be provided in due time by buyers with the customary time for loading. Buyers undertake that at least six clear days' notice shall be given to shippers direct before arrival of any steamer to load under this contract, such notice stating steamer's and charterer's name, and that full loading orders shall be in shipper's hands not later than six days before the notified due date of such vessel's arrival.

5. A margin of 10 per cent, more or less, but not exceeding 50 standards, is to be allowed to buyers for convenience of chartering, but when several shipments are made under the same contract, such margin shall only apply to the quantity by the last vessel. Should buyers under this clause demand an increase of total contract quantity, sellers to give such increase in contract sizes, though not more than double the quantity of any item.

6. Shippers' liability to load at "first open water" shall not commence until the deliveries from the wharves and quays are entirely unhindered by ice. (NOTE.—It is suggested that a clause to this effect be inserted in the charter party.)

7. Marine insurance of cargo and freight advance to be covered by the buyers and opened as soon as tonnage is secured. It is understood that buyers' marine risk commences if and when the goods are loaded into lighters for shipment after receipt of the notice from steamer of her expected arrival.

8. Any freight advance to be settled by cash in exchange for captain's receipt except on firewood, when loaded by sailing vessel, in which case by 30 days' draft from date of bill of lading.

9. In case the manufacture and/or shipment of any of the goods be delayed or hindered by floods, drought, ice, destruction of mill and/or goods herein specified by reason of fire, strikes, lockout, or any similar cause, shippers shall not be responsible for any damages arising therefrom, provided prompt notice be given to the buyer, but in such event only shippers have the right during ------ weeks from stipulated date of delivery of completing the contract; but on the expiration of such extended time, if shippers then declare or have previously declared their inability to deliver, buyers shall thereupon have the option, to be promptly declared, of canceling the contract or continuing the same for such date of delivery as may be mutually agreed upon, but in any event not later than the following

f. o. w. A strike or lockout of the shippers' men only shall not exonerate them from any demurrage for which the charterer may be liable under the charter, if by the use of reasonable diligence the shipper could have obtained other suitable labor.

10. It is mutually agreed that, should war, prohibition of export, or blockade prevent shippers from shipping or buyers from lifting the goods herein specified within the time stipulated in the contract, this contract shall be canceled for goods not delivered.

11. Payment to be made on receipt of and in exchange for shipping documents by approved acceptances of sellers' or authorized agents' drafts, payable in London at ------ months from the date of bill of lading, or at buyers' option, in cash, less 2½ per cent discount payable in London. Sellers to give notice of vessel's arrival (in the case of steamers by telegraph), and buyers' option as to mode of payment to be declared on receipt of such notice.

12. Should any of the goods not be removed by ----------, payment to be made in the manner provided above against approximate invoice of the said date, the goods then remaining at the risk of the buyers but at the expense of the sellers, provided, however, that if the goods are still unshipped by August 31 of the following year, the buyer shall pay 5s. per standard rent to the sellers. Buyers' liability to pay for the goods under this clause shall, however, be suspended if the failure to remove is due to any of the contingencies covered by clause 9, and the drawing date shall be postponed for a period corresponding in length to the duration of the delay.

13. No complaint or claim will be recognized by sellers upon any goods shipped under this contract, unless reasonable particulars are given to agents within 21 days from date of ship's final discharge, but any claim on the condition of the goods shall be announced within 14 days thereof. No claim shall be recognized on any item or separate parcel shipped which has been broken into; but otherwise buyers shall be at liberty to deal with any items or parcels on which there is no complaint without prejudice to their right to claim on any intact items or parcels (including separate bills of lading delivered overside) under the arbitration clause. An item or parcel shall be considered to be intact if it can be produced to the arbitrators in its entirety as discharged.

14. Property in goods to be deemed for all purposes, except retention of vendor's lien for unpaid purchase price, to have passed to buyers when goods put on board.

15. The goods to be shipped under as many bills of lading as may be required by buyers, provided that the total number issued shall not exceed 5 per 100 standards, and that for any bills of lading of less than 20 standards buyers shall pay 1 guinea.

16. Should any dispute arise under this contract which it may be found impossible to settle by amicable arrangement, the same shall forthwith be referred to the decision of a third party to be mutually agreed upon, or in default of agreement to two arbitrators, one arbitrator to be appointed by the sellers and one by the buyers. Such arbitrators shall, previously to entering upon the arbitration, appoint an umpire, and the arbitration shall be subject to the English arbitration act of 1889, or any subsisting statutory modification thereof or substitution therefor. Buyers shall not reject the goods herein specified, but shall accept or pay for them in terms of contract against shipping documents. In the event of either side failing to appoint their arbitrator within seven days after being requested through the agents under this contract so to do, the arbitrator thus required shall be appointed by the president, or failing him by the vice president of the Timber Trade Federation of the United Kingdom, on the application of either party. In the case of a claim not exceeding £25, or on less than 25 standards, the dispute shall, if not amicably settled, be referred to one arbitrator, and in default of the parties agreeing on his appointment, he shall be appointed by the president, or failing him by the vice president of the Timber Trade Federation of the United Kingdom. Every arbitrator or umpire shall be selected from members of the timber trade, or from the arbitrators approved by the Timber Trade Federation of the United Kingdom, or by the Scandinavian Sawmillers' Associations. Any award shall be final and binding upon both parties. The costs of such arbitration shall be left to the discretion of the arbitrators or umpire. In deciding as to costs, the arbitrators or umpire shall take into consideration the correspondence between the parties relating to the dispute, and their respective efforts to arrive at a fair settlement. This agreement shall be made a rule of court on the application of either party.

The above clause not to apply in case of any of the goods being shipped to the colonies or Mediterranean ports.

Code Name: "ALBION"

CONTRACT

(C. i. f. Form)

Adopted by the Timber Trade Federation of the United Kingdom and the Swedish Wood Exporters' Association, 1922

Sold to ____
Bought of ____
through the agency of ______________________________

the wood goods hereinafter specified, subject to a variation "in sellers' option" of 10 per cent more or less on any or every item, but not exceeding 20 standards on any one item, always provided that the total quantity is not varied except under the provisions of clause 5. Items of 2 to 10 standards may be varied to the extent of 1 standard. In the event of over-shipment of any item, buyers are not compelled to accept or pay for anything beyond the quantity and margin stated in the contract. In the event of undershipment of any item, buyers are to accept or pay for the quantity shipped, but have the right to claim compensation for the quantity short-shipped. Each item of this contract to be considered a separate interest.

The goods to be shipped at __________ by vessel calculated by owners ready to load during __________; in the event, however, of loading not having commenced within six weeks after stipulated time of shipment, buyers reserve the right of canceling the contract to a corresponding extent. **Prices include first** cost, freight, and insurance to __________ always afloat.

Other conditions as specified on the back.

SPECIFICATIONS

____
____

________________ the ____ 192__   ________________ the ____ 192__

__________________________ (As seller)   __________________________ (As buyer)

CONDITIONS

1. The prices are in British sterling: Sawn goods per St. Petersburg standard of 165 cubic feet; planed goods per St. Petersburg standard of 165 cubic feet (nominal measure); hewn goods per load of 50 cubic feet (customs' caliper measure), except Upper Gulf hewn balks; firewood per fathom of 216 feet cube.

2. The prices for sawn and planed goods are for lengths 9 feet and up with falling ends 6–8 feet at two-thirds price. Where ends are shipped in excess of 3 per cent under the Scanfin charter, or 5 per cent in the case of the Backrut charter, of the total contract quantity, such excess of ends, if according to contract, shall be taken at two-thirds f. o. b. price plus full freight, as per charter party or bill of lading. Such ends to be regarded as included in the quantities named on the other side but to be disregarded in the calculation of average length.

3. The goods are to be properly seasoned for shipment to the country of destination and shall be of sellers' usual bracking, average length, and fair specification for such description of goods, and delivered to the ship in accordance with the custom of the port, the sellers not being responsible for any deterioration occasioned by circumstances beyond their control after the goods have left sellers' wharf properly protected.

4. Ship room to be secured by sellers in due time; they, however, not to be responsible for any delay in shipment occasioned by circumstances beyond their control. Buyers undertake that full loading orders shall be in sellers' hands not later than 10 days before the time of shipment stipulated in contract.

Steamer to employ at the port of loading stevedore approved by Sveriges redareforening (The Swedish Shipowners' Association) at current rates.

Should any vessel chartered under this contract be lost previous to loading, sellers have the option of chartering in substitution other tonnage calculated to be available for loading within the stipulated time of shipment or of canceling the contract to such an extent upon giving prompt notice to buyers, leaving, however, the buyer's option to take the goods at a corresponding f. o. b. price, i. e., the c. i. f. prices stipulated less cost of insurance and the rate of freight whereat tonnage lost had been secured.

5. A margin of 10 per cent, more or less, on the contract quantity is to be allowed to sellers for convenience of chartering. Any such increase to be given only in contract sizes, but not more than double the quantity of any item. When several shipments are made under the same contract, such margin shall only apply to the quantity by the last vessel.

6. Marine insurance of cargo and freight advance, including mine risk, and adding 10 per cent for buyers' account to the f. o. b. invoice amount, to be covered by sellers and opened as soon as tonnage is secured in a first-class office (if a foreign office to be one approved by the Timber Trade Federation of the United Kingdom and the Swedish Wood Exporters' Association, or otherwise one mutually agreed upon between buyer and seller), as per Lloyd's form of policy, together with federation clauses printed in margin, payable in London.

7. Any freight advance, which is not to exceed one-third of the total freight, to be settled by cash in exchange for captain's receipt, except on firewood, when loaded by sailing vessel, in which case by 30 days' draft from date of bill of lading.

8. In case the manufacture and/or shipment, and/or sea transport of any of the goods should be delayed or hindered by reason of fire or through an accident to the sawmills, or through drought, ice, floods, strike, or lockouts, mobilization, or through any other cause beyond the sellers' control, the sellers shall not be responsible for any damages resulting to the buyers therefrom; if shipment of the whole or part is thereby effectively rendered impossible within six weeks of the stipulated time of shipment, sellers shall then have the option of canceling the contract to the extent of their inability to deliver, and also of being released from the obligation of delivering the remainder, leaving, however, in this event, buyers the right of taking the goods that are available at corresponding f. o. b. price subject prompt decision.

9. In the event of prohibition of export or import, blockade, war or mobilization for war, preventing shipment within the time stipulated or within such extended time as in the preamble or otherwise mutually agreed upon, this contract, or any unfulfilled part thereof, to be canceled. If through any of the reasons enumerated above a rise in the rates of the sea freights should occur exceeding 1 guinea per standard as compared with the rates ruling when this contract was closed, sellers to have the option of canceling the contract, but such option on the part of sellers must be declared in writing to buyers through their agent within six weeks of the stipulated contract date of shipment.

10. Buyers to pay for the freight as per charter party or bill of lading, which is to be on usual Scanfin or Backrut form according to destination of goods, and for the balance on receipt of and in exchange for shipping documents and good policy of insurance in cash less 2½ per cent discount payable in London, or at buyers' option, by approved acceptances of sellers' or authorized agents' drafts, payable in London at ______ months from date of bill of lading. Sellers to give notice of vessel's arrival (in the case of steamers by telegraph), and buyers' option as to mode of payment to be declared by wire on receipt of such notice, failing which, the decision regarding mode of payment to rest with sellers.

11. No complaint or claim will be recognized by sellers upon any goods shipped under this contract, unless reasonable particulars are given to agents within 14 days from date of ship's final discharge. No claim shall be recognized on any item or separate parcel shipped which has been broken into, but otherwise buyers shall be at liberty to deal with any items or parcels on which there is no complaint without prejudice to their right to claim on any intact items or parcels (including separate bills of lading delivered overside) under the arbitration clause. An item or parcel shall be considered to be intact if it can be produced to the arbitrators in its entirety as discharged.

12. Property in goods to be deemed for all purposes, except retention of vendors' lien for unpaid purchase price, to have passed to buyers when goods have been put on board.

13. The goods to be shipped under as many bills of lading as may be required by buyers, provided that the total number issued shall not exceed 5 per 100 standards, and that for any bill of lading in excess, buyers shall pay 2 guineas.

14. Should any dispute arise under this contract which it may be found impossible to settle by amicable arrangement, the same shall forthwith be referred to the decision of a third party to be mutually agreed upon, or in default of agreement to two arbitrators, one arbitrator to be appointed by the sellers and one by the buyers, such arbitrators shall, previously to entering upon the arbitration,

appoint an umpire, and the arbitration shall be subject to the English arbitration act of 1889, or any subsisting statutory modification thereof or substitution therefor. Buyers shall not reject the goods herein specified but shall accept or pay for them in terms of contract against shipping documents. In the event of either side failing to appoint their abritrator within seven days after being requested through the agents under this contract so to do, the arbitrator thus required shall be appointed by the president, or failing him by the vice president of the Timber Trade Federation of the United Kingdom, on the application of either party. In the case of a claim not exceeding £25, or on less than 25 standards, the dispute shall, if not amicably settled, be referred to one arbitrator, and in default of the parties agreeing on his appointment, he shall be appointed by the president, or failing him by the vice president of the Timber Trade Federation of the United Kingdom. Every arbitrator or umpire shall be selected from members of the timber trade or from the arbitrators approved by the Timber Trade Federation of the United Kingdom, or by the Scandinavian Sawmillers' Associations. Any award shall be final and binding upon both parties. The costs of such arbitration shall be left to the discretion of the arbitrators or umpire. In deciding as to costs, the arbitrators or umpire shall take into consideration the correspondence between the parties relating to the dispute, and their respective efforts to arrive at a fair settlement. This agreement shall be made a rule of court on the application of either party.

The above clause not to apply in case of any of the goods being shipped to the colonies or Mediterranean ports.

TIMBER TRADE FEDERATION INSURANCE CLAUSES

1. Each raft or craft or deck load or bill of lading or deck load of each bill of lading to be deemed a separate insurance if required by assured.

2. Including risk of theft and pilferage, irrespective of percentage, and (subject to franchise conditions) all risks from time of leaving mill, warehouse, factory, yard, or premises at the place from which the goods are loaded onto, or conveyed by craft, raft, and/or lighters to, the ocean-going vessel, whilst on board the ocean-going vessel; while in shed or on wharf or quay after discharge at port of destination; and while in transit by land and/or water to the mill, warehouse, factory, yard, or premises at port of destination and until safely delivered therein. Including all risks of transshipment and/or landing, whilst on shore, and of reshipment wherever incurred and all liberties and liabilities as per bill of lading, or contract of affreightment.

3. Including transit by craft, raft, and/or lighter to and from the vessel. The assured are not to be prejudiced by any agreement exempting lighterman from liability.

4. Loss from craft and/or raft and/or of deck load to be recoverable irrespective of percentage.

5. Seaworthiness admitted.

6. In case of deviation, change of voyage, or additional risk not specified to be held covered upon terms to be arranged.

7. Including risk of negligence, default, or error in judgment of the pilot, master, mariners, engineers, or others of the crew, or stevedores or other persons employed by the shipowner, or for whose acts he is responsible.

8. General average and salvage charges recoverable according to foreign statement or the York/Antwerp rules and/or the York/Antwerp rules, 1890, if in accordance with the contract of affreightment, but jettison of deck load to be deemed general average.

9. To pay the insured value of any portion of the cargo which may be totally lost in loading, transshipment, or discharge, also any loss or damage which may reasonably be attributed to discharge of cargo at a port of distress, also to pay landing, warehousing, forwarding, and special charges if incurred.

10. In event of claim for depreciation on cargo, advances to pay as cargo, and claim to be based on comparison of the net sound and damaged values, after deduction of freight and charges payable at destination.

11. To include risks of jettison and washing overboard.

12. Deck load warranted free from particular average unless the vessel or craft be stranded, sunk, or burned, but the assurers are to pay the insured value of any portion of the cargo which may be totally lost by jettison and washed overboard or in loading, transshipment or discharge, also any loss of or damage to the interest insured which may reasonably be attributed to fire, collision, or contact of the vessel and/or craft and/or conveyance with any external substance (ice included) other than water, or to discharge of cargo at a port of distress, but this clause not to affect underwriters' liability for landing, warehousing, forwarding, and special charges for which they would otherwise be liable.

13. Warranted free of capture, seizure, arrest, restraint, or detainment, and the consequences thereof, or of any attempt thereat (piracy excepted) and also from all consequences of hostilities or warlike operations, whether before or after declaration of war.

14. Warranted free of loss or damage caused by strikers, locked-out workmen, or persons taking part in labor disturbances, or riots or civil commotions.

Should clause 13 be deleted, clause 15 to operate as part of this policy.

15. Warranted free of any claim based upon loss of or frustration of the insured voyage, or adventure, caused by arrests, restraints, or detainments of kings, princes, or peoples.

ADDITIONAL CLAUSES APPLICABLE TO POLICIES ISSUED BY NONENGLISH UNDERWRITERS

Lloyd's standard printed form of policy, together with the federation clauses attached (or as incorporated), shall be deemed to be the basis of the insurance and shall override all terms and conditions of the foreign form of policy inconsistent therewith.

Any question as to the interpretation of this policy shall be settled according to English law, the jurisdiction of the English courts admitted by assurers.

London settlement.—Names of paying bankers and/or agents to whom notice of claim is to be sent, and who are authorized to accept service of writ for and on behalf of assurers to be stated on policy.

Where the insured amount is expressed both in a foreign currency and in sterling, claims shall be adjusted at the rate of exchange thereby indicated. If expressed in a foreign currency only, the settlement shall be effected at the rate in force for sight bills in London on the date of the policy.

American hardwoods.—Most of the sales of American hardwoods are made on the "Hardwood Lumber Contract Form, 1922," with arbitration clause as revised February, 1926, appended. This form has been adopted by the hardwood section of the Timber Trade Federation of the United Kingdom and the National Lumber Exporters' Association (United States). The form of contract for hardwood follows:

Hardwood Lumber Contract Form, 1922

Adopted by the hardwood section of the Timber Trade Federation of the United Kingdom and the National Lumber Exporters' Association (U. S. A.)

MEMORANDUM OF AGREEMENT made this ------ day of --------, 192--, between ----------, for and on behalf of ----------, the sellers, and -------- of ----------, the buyers.

WHEREBY the former sell and the latter buy the undermentioned lumber at the prices and on the terms and conditions stated hereon for shipment from the mills, as follows, viz:

SPECIFICATIONS

Prices are c. i. f., f. o. b., cars/steamer, f. a. s., ex quay.
Marks.
Terms of payment.

CONDITIONS

Shipment.—Unless otherwise stated the term "shipment" means shipment from the mill or interior shipping point.

Goods for immediate or prompt shipment must be shipped within 45 days of the date of contract.

Sellers are not to be liable for nonshipment or delay if arising from war, restraints of rulers, fire, floods, droughts, storms, strikes, or lockouts, railway embargoes, or any other causes over which they have no control.

Should shipment not be made within the time stipulated, buyers shall have the right to (1) cancel that part of the contract which has not been shipped within the time stipulated, provided they give due notice before the goods are en route or the car number declared, or (2) demand arbitration thereon for the assessment of damages under the arbitration clause hereinafter contained only on such part of said contract not en route or the car number declared. Should the buyer demand such arbitration, the portion arbitrated upon becomes automatically canceled.

Quality.—All lumber to be graded according to the grading rules of the National Hardwood Lumber Association or the American Hardwood Manufacturers' Association in force at the date of this contract. All lumber claimed not to be up to grade must be laid aside in a separate and distinctive pile where reasonably possible for inspection at the time it is received, and the lumber which is thus laid aside shall be the only basis for the settlement of claims which must be made before its removal. If special or dimension lumber, all conditions as to quality specification and manufacture to be----------.

Insurance.—Goods under c. i. f. contract are to be insured, plus 10 per cent for buyers' benefit. Where the goods are sold f. o. b. or f. a. s., sellers shall insure to cover the estimated c. i. f. cost plus 10 per cent for buyers' account. The buyers shall accept the usual certificate of marine insurance in lieu of the actual policy.

Arbitration clause as revised February, 1926.—Should any dispute arise with respect to any matter connected with this contract the buyers shall nevertheless accept custody of the goods as shipped and make due payment, but such acceptance and payment shall be without prejudice. All disputes shall be settled by friendly arrangement, if possible, failing which the matter or matters in dispute shall be referred to the decision of an arbitrator to be mutually agreed upon. In default of such agreement one arbitrator shall be appointed by the sellers and one by the buyers, who shall, before entering upon the arbitration, appoint an umpire. In the event of either party failing to appoint his arbitrator within seven days after being requested through the agents under this contract so to do, the arbitrator thus required shall be appointed by the chairman or failing him, the deputy chairman for the time being of the hardwood section of the Timber Trade Federation of the United Kingdom. In the case of any claim not exceeding 10 per cent of the c. i. f. value (excluding London clause charge) one arbitrator only shall be appointed and in default of agreement such arbitrator shall be appointed by the chairman, or failing him, the deputy chairman for the time being of the hardwood section of the Timber Trade Federation of the United Kingdom. All arbitrators and/or umpires shall be selected from the approved panel of arbitrators appointed by the hardwood section of the Timber Trade Federation of the United Kingdom. Notwithstanding anything herein contained the arbitrators or umpire have the right should they so decide, to order the return of the goods to the seller if they find that the goods are not fair tender against the contract, and also to order the sellers to reimburse the buyers for all amounts paid. The arbitration shall be subject to the English arbitration act of 1889, or any subsistent statutory modification thereof or substitution therefor. The award of the arbitrators or umpire shall be binding on all parties under this contract. The cost of the arbitration shall be left to the discretion of the arbitrators or umpire; but in this connection, any offers of settlement by either of the parties to the dispute shall be taken into consideration. This submission shall be made an order of His Majesty's High Court of Justice on the application of either party.

Measurement.—In accordance with the agreement existing between the National Lumber Exporters' Association of the United States and the Timber Trade Federation of the United Kingdom.

Quantity.—Unless this contract states a specific quantity of either cubic or superficial feet a carload shall be considered to contain the equivalent of about 15,000 superficial feet board measure of 1 inch. When used the term "about" shall mean within 10 per cent in proportion of the specification under or over the quantity specified except in the case of dimension stock, when the term "about" shall mean within 5 per ecnt of the number of pieces in proportion of the specification under or over the quantity specified.

In the case of noncompliance by the buyers with any of the terms of this contract the sellers to have immediate option of resale for buyers' account.

American softwoods.—There are no standard forms of contract governing sales of southern pine and Pacific-coast woods, many different ones being used by the various agents. In the main, however, they are similar in the principal points, and the following are given as examples:

PITCH PINE CONTRACT

Memorandum of Agreement between ----------, who sell as agents for ---------- and ---------- who buy for shipment ------------------------ a quantity of pitch pine of the assortment and at the prices stated below, all in British sterling and warranted of fair average quality of the season's shipment according to the usual classification and measurement at port of shipment.

Sellers shall not be liable for nonshipment, nondelivery, or delay arising from war, restraints of rulers, fire, floods, droughts, storms, strikes, combinations, or any other causes over which they have no control, nor for any deviation from the assortment named below by reason of any part of the cargo being returned, lost, or cut by the ship, or if the master has overestimated the capacity of his vessel.

In the event of war between any of the great European powers, or in which the United States of America are involved, sellers shall have the option of canceling this contract or any unshipped portion thereof, and buyers shall then have the option of taking the goods on a free-on-board basis, deducting from the prices named below the current rate of freight at the time this contract was made.

Should the vessel or vessels fixed for this contract be lost or delayed by accident before the commencement of the loading and after the name has been declared to the buyers, sellers shall have the option of substituting another vessel or vessels within a reasonable time or canceling the contract.

All pitch pine sold under this contract shall be in accordance with the current Gulf-coast classification.

This contract is contingent upon accidents, delays of carriers, regulations of the Federal Government, and other delays unavoidable and beyond shippers' control.

Payment.—Freight shall be deducted from invoice on foreign measure as customary, but shall be paid by buyers as per charter party and/or bill of lading, and balance shall be by acceptance approved by drawers of sellers or sellers' agents' draft payable in London, at 120 days from date of, and in exchange for bill of lading and other shipping documents, with policy or certificate of insurance excluding war risk, or in cash less discount at 5 per cent per annum at buyers' option.

If required the buyers shall give sellers or sellers' agents an approved acceptance at 60 days if cargo is shipped by a sailing vessel, or at 30 days if by steamer, from date of bill of lading payable in London, for any advance made abroad on account of freight, receiving in exchange the master's receipt on the bill of lading and a policy or certificate of insurance including war risk, for amount of said advances.

Should any difference arise under this contract, or should the shipment be delayed beyond the time named in this contract, the buyers shall not reject the goods, as shipped, nor refuse immediate payment for same as stipulated herein, but when due payment has been made such difference shall be referred to two arbitrators for settlement, one to be named by each party, and such arbitrators shall have power to appoint an umpire, who shall decide whether any and what allowance shall be made and the decision of such arbitrators or their umpire shall be final and binding upon buyers and sellers. Each arbitrator shall be a commercial man and conversant with the species of wood in question. The cost of the arbitration shall be equally divided between buyers and sellers. No claim shall be made in respect of any parcel broken into, or unless notice is given to the sellers within 10 days of final discharge of the goods. In case of the noncompliance of the buyers with any of the terms of this contract, sellers shall have immediate power of resale either by public sale or private treaty at sellers' option.

Any question arising under this contract shall be subject to English law.

The prices are for foreign measure, and include first cost, freight, and insurance to ---------- or as near thereto as the vessel can safely get and discharge always afloat. Lighterage (if any) to be at the expense and risk of buyers.

PACIFIC COAST STANDARD

Memorandum of Agreement between ----------, who sell as agents for ---------- and ---------- who buy for shipment ---------- a quantity of ---------- of the assortment and at the prices stated below, all in British sterling, and warranted of fair average quality of the season's shipment according to the conditions, usual classification, and measurement at port of shipment, as provided by the ---------- list of the Pacific Lumber Inspection Bureau (Inc.), and shipped in the usual and customary manner from ----------.

Sellers shall not be liable for nonshipment, nondelivery, or delay arising from war, restraints of rulers, fire, floods, droughts, storms, strikes, combinations, accidents, delays of carriers, or any other causes over which they have no control, nor for any deviation from the assortment named below by reason of any part of the cargo being returned, lost or cut by the ship, or if the master has overestimated the capacity of his vessel. To facilitate chartering the quantities to be increased or decreased in proportion of specification named below, but not exceeding 10 per cent either way. Official surveyor's measurement certificate to be attached to shipping documents. In the event of war between any of the great European powers, or in which the United States of America are involved, sellers shall have the option of canceling this contract or any unshipped portion thereof, and buyers shall then have the option of taking the goods on a free-on-board basis, deducting from the prices named below the current rate of freight at the time this contract was made. Should the vessel or vessels fixed for this contract be lost before the commencement of the loading and after the name has been declared to the buyers, sellers shall have the option of substituting another vessel or vessels within a reasonable time or canceling the contract. The word "about" allows a margin of 10 per cent more or less.

Payment.—Freight shall be deducted from invoice on foreign measure as customary, but shall be paid by buyers as per charter party and/or bill of lading, and balance shall be by acceptance approved by drawers, of sellers or sellers' agents draft payable in London, at 120 days from date of, and in exchange for bill of lading and other shipping documents, with policy or certificate of insurance excluding war risk, or in cash less discount at 5 per cent per annum, at buyers' option. If freight prepaid and if required the buyers shall give sellers or sellers' agents an approved acceptance at ------ days if cargo is shipped by a sailing vessel, or at ------ days if by steamer from date of bill of lading payable in London, receiving in exchange the master's receipt on the bill of lading and a policy or certificate of insurance, including war risk, for amount of said advances.

Should any difference arise under this contract, or should the shipment be delayed beyond the time named in this contract, the buyers shall not reject the goods, as shipped, nor refuse immediate payment for same as stipulated herein, but when due payment has been made such difference shall be referred to two arbitrators for settlement, one to be named by each party, and such arbitrators shall have power to appoint an umpire, who shall decide whether any and what allowance shall be made, and the decision of such arbitrators or their umpire shall be final and binding upon buyers and sellers. The cost of the arbitration shall be equally divided between buyers and sellers. No claims to be made or entertained on any parcel broken into, or unless notice is given to the sellers' agents within seven days of final discharge of the goods. In case of the noncompliance of the buyers with any of the terms of this contract, sellers shall have immediate power of resale, either by public sale or private treaty at sellers' option.

The prices are for foreign measure, and include first cost, freight, and insurance to ---------- or as near thereto as the vessel can safely get and discharge always afloat. Lighterage (if any) to be at the expense and risk of buyers.

Stowage, if required by ship, to be supplied in ---------- at ---------- per Petrograd standard.

ARBITRATION

Arbitration is seldom satisfactory to both parties and is a fruitful cause of ill feeling between shippers and their British agents and/or customers; for that reason it should only be used as a last resort when all other means to secure an amicable settlement have failed. On the other hand, if an amicable settlement can not be reached, arbitration, with all its defects, is a much less expensive and speedier method than by resorting to legal action. American lumber exporters, however, are recommended to avoid arbitration whenever possible and make every effort to arrange an amicable settlement, thereby maintaining good will and saving the expenses incidental to arbitration; these frequently, in cases where a small sum is involved, amount to almost as much as the claim itself. Preferably, a dispute failing of settlement, action should be placed in the hands of a single arbitrator. While theoretically the appointment by each party to the dispute of their own arbitrator may be best, in practice they usually become advocates of their nominators' case (and there is nothing in law against this custom) and, in the majority of instances, they are unable to come to an agreement, so that it is necessary for an umpire to be appointed, in which event three fees and three expense accounts must be paid. In some contracts the cost of the arbitration is equally divided between buyer and seller—i. e., the foreign shipper—while in others it is left to the discretion of the arbitrators or umpire.

All lumber contracts used in the import trade contain an arbitration clause providing machinery for dealing with disputes which have been impossible of settlement by amicable arrangement.

The general practice is for each side to name its own arbitrator who, in the event they are unable to agree, appoint an umpire whose decision shall be final. Persons nominated for this work must be on the list or panel of arbitrators recognized by the Timber Trades Federation, who are selected as having special knowledge of the branch of the industry involved.

CHARTER PARTIES

Practically the only lumber now imported into Great Britain and Ireland in full cargo lots is that originating in the Baltic, Norway, and the White Sea district of Russia. The forms of charter used for these shipments have been adopted by the documentary council of the Baltic and White Sea conference in agreement with the Timber Trade Federation of the United Kingdom, and are published by the Chamber of Shipping of the United Kingdom.

The form known by the code name of "Baltwood" is used for charters from the Baltic and Norway, while the "Merblanc" or occasionally "Russ-Pruss" is used for White Sea loadings. The Baltwood and Merblanc forms are printed below by permission of the documentary committee of the chamber of shipping.

FORM OF "BALTWOOD" CHARTER

Code name: "BALTWOOD"

CHAMBER OF SHIPPING BALTIC WOOD CHARTER 1926

(Baltic and Norway to Great Britain and Ireland)

For Steamships and Full-Power Motorships

LONDON, ----------, 19--.

IT IS THIS DAY MUTUALLY AGREED between ----------, owners of the good steamship or motorship called the ----------, of ------ tons net register, and of the carrying capacity of ---------- St. Petersburg standards, or thereabouts, inclusive of deck load (the shipowner having a margin of 7½ per cent more or less up to 750 standards and in addition 5 per cent upon any further quantity beyond the 750 standards), now ---------- and expected ready to load about ---------- and ---------- of ---------- charterers:

1. That the said vessel being tight, staunch, and strong, and in every way fitted for the voyage, shall, with all convenient speed (having liberty to take cargo for owners' benefit, to any port or ports in the Baltic or North Sea, or to ----------, after discharging the same) sail and proceed to ----------, or so

near thereunto as she may safely get, and there load, always afloat, from the agents of the said charterers, a full and complete cargo of mill-sawn red and/or white firwood deals and/or battens and/or boards and/or scantlings and/or slatings in bundles and/or laths in bundles and/or staves in bundles and/or planed boards and/or floorings (the quantity of sawn boards to consist of about ---------- standards of which the quantity under 1 inch thick to consist of about ---------- standards, the quantity of scantlings to consist of about ---------- standards, the quantity of slatings to consist of about ---------- standards, the quantity of laths to consist of about ---------- standards, the quantity of staves to consist of about ---------- standards, the quantity of planed boards and/or floorings to consist of about ---------- standards, "about" within this bracketed clause being read as meaning 10 per cent more or less), with a sufficient quantity of ends, 8 feet and under, for broken stowage only, but ends shall not be shipped in excess of 7½ per cent of the entire cargo except when slatings and/or laths are included, unless otherwise mutually agreed. Charterers shall have the option of shipping up to ------ fathoms of firewood. (Memo: Shipowners may agree any other description of cargo. Shipowners may agree to expunge the words "always afloat" at loading and/or discharging ports, or agree a special lighterage clause for shallow ports or places.)

Two per cent of the entire cargo shall be regarded as ends for broken stowage and carried at two-thirds freight unless a full cargo of firewood and/or laths and/or staves is shipped, in which event this provision shall not apply.

The vessel shall be provided with a deck load, at full freight as under, at charterers' risk, not exceeding what she can reasonably stow and carry over and above her tackle, apparel, provisions, and furniture.

Being so loaded the vessel shall proceed therewith to ---------- or so near thereunto as she may safely get, and deliver the cargo, always afloat, upon being paid freight and charges (if any) under clause 15, as follows:

	£	s.	d.	
For deals and battens	----------	----------	----------	Per St. Petersburg standard hundred of 165 cubic feet.
For boards	----------	----------	----------	Do.
For boards under 1 inch thick	----------	----------	----------	Do.
For scantlings	----------	----------	----------	Do.
For slatings	----------	----------	----------	Do.
For laths	----------	----------	----------	Do.
For staves	----------	----------	----------	Do.
For planed boards and/or floorings.	----------	----------	----------	Do.
For ends	----------	----------	----------	Do.
	2 per cent of the entire cargo (including deck load) at two-thirds freight, and any in excess of this at full freight.			
For firewood	----------	----------	----------	Per cubic fathom of 216 cubic feet.
	If the port of discharge is not included in the schedule of apportionment, no charges payable under clause 15 are included in the above figures, which represent freight only, and the said charges shall be paid in addition.			

NOTE.—Battens to be considered 2 by 4 inches, and up to 3 by 7 inches. Slatings to be considered 1 inch and under in thickness and 3 inches and under in width.

If the consignees select one of the alternatives mentioned in clause 15, other than discharge onto the quay (which includes rough stacking thereon if and where customary and not usually done by the consignees), any additional expense (plus 15 per cent thereon and in addition the charge for workmen's compensation insurance) of such delivery beyond the expense of delivery onto the quay as aforesaid shall be paid by the consignees to the shipowner, in addition to the amount(s) above mentioned. If the port of discharge is included in the schedule of apportionment last agreed between the Chamber of Shipping of the United Kingdom and the Timber Trade Federation of the United Kingdom, such additional expense shall be ascertained in accordance therewith.

2. The master or owners shall telegraph the shipper or shippers of the cargo (telegraphic address(es) as per margin), stating the vessel's and the charterers' names and giving at least seven consecutive calendar days' notice of the probable date of vessel's arrival at the first loading port. Default of this shall not be considered a breach of charter, but charterers shall not be responsible for delay in loading caused by such default of the master or owners.

3. (*a*) In the event of vessel being chartered for "first open water" if vessel is not ready to load within four weeks of the official opening for navigation of the port where vessel is to commence loading, charterers shall have the option of canceling this charter.

(*b*) Time for loading shall not commence before ----------, and charterers shall have the option of canceling this charter if vessel is not ready, at the (first) loading port, to load on or before ----------.

(*c*) If, when the vessel is ready to leave her last outward port for the (first) port of loading, the owners inform the charterers by telegram that she can not reach the (first) loading port before the canceling date named in the charter, the charterers shall declare by telegram within 12 business hours from their receipt of such notice whether or not they cancel the charter.

(Memo: Delete the alternative section (*a*) or (*b*) not adopted.)

4. If the goods intended for shipment under this charter by the shipper mentioned in the margin of the charter are destroyed by fire, or fire at the mill prevents their being provided, the charterers shall have the right of canceling this charter, immediate notice thereof being given by telegram to the owners or their brokers.

In the event of part cargo having been shipped and the remainder of the goods intended for shipment being destroyed by fire, or fire at the mill preventing their being provided, charterers' liability to ship the balance of the cargo shall thereupon cease and the vessel shall proceed with the cargo then aboard, having liberty to fill up for vessel's benefit at the same or at any other port or ports either for the same destination or for any other port or ports whether any of such ports are in the course of the chartered voyage or not.

5. The master shall be at liberty to bring iron or other dead weight as ballast from the loading or any port.

6. At loading port the cargo shall be brought alongside the vessel in the customary manner at charterers' risk and expense.

The cargo shall be loaded with customary steamship dispatch as fast as the vessel can receive during the ordinary working hours of the port but according to the custom of the port, Sundays and general or local holidays excepted (unless used).

(Memo: Shipowners may arrange for a fixed average number of standards per day for loading and/or discharging.)

At Finnish ports the shipper shall pay the export duty (if any) on the cargo in time to enable the vessel to sail without delay upon completion of the loading. Failing his doing so the shipper shall pay demurrage for time lost by such failure at the rate agreed upon herein.

Any dispute arising at the port of loading shall be settled before signing bills of lading, otherwise claims shall be indorsed upon the bills of lading, and if for any reason the master is prevented from so doing he shall telegraph notice of the claim and the amount thereof to the charterers. If the claim is not so indorsed or the master does not telegraph before the vessel sails, or radiograph prior to the vessel's arrival at the discharging port, the vessel shall have liberty to deviate to any port after sailing for the purpose of enabling the master to telegraph. If such claim is not so indorsed or such telegram is not sent either from loading port or some port after sailing, or by radiogram before arrival at discharging port, the shipowner shall not be entitled to exercise any lien on the cargo in respect of such claim of the shipowner arising at the loading port.

7. Cash for vessel's ordinary disbursements only at port of loading shall be advanced by the shipper, if required by the master, at the closing rate of exchange at the port of shipment on the day the advance is taken, subject to cost of insurance only. The amount of the advance shall be indorsed upon the bill of lading in British sterling.

8. (*a*) In the event of the charter providing for one loading port only, if when the vessel is ready to proceed from her last port or at any time during the voyage to the loading port the shipowner is informed by the shipper whose name first appears in the margin hereof and the shipowner's agent at port of loading that in their opinion the port is not accessible and/or the shipment of the goods is not practicable by reason of ice, the charter shall be canceled forthwith, and the shipowner shall advise the charterers by telegram.

(*b*) In the event of the charter providing for one loading port only, if upon vessel's arrival off the port or so near thereunto as she can get, ice, in the opinion of the master, prevents the vessel entering the port of loading, the charter shall be canceled forthwith and the shipowner shall advise the charterers by telegram.

(*c*) In the event of the charter providing for more than one loading port, if, in the opinion of the master, the first port is inaccessible vessel shall proceed in rotation to the next loading port or ports named in the charter which in the opinion of the master is or are accessible. If all the ports named in the charter are, in the opinion of the master, inaccessible, the charter shall forthwith be canceled and the shipowner shall advise the charterers by telegram. If, in the opinion of the master, the first port named in the charter is inaccessible as aforesaid, but the ship shall arrive at a subsequent port named in the charter which the master shall consider accessible, the charterers shall declare forthwith either to cancel the charter or to load a full and complete cargo at the loading ports specified in the charter which are accessible, completing if necessary at any other safe open port on the same coast and in the same country but not farther north.

(*d*) If after arrival the master, for fear of vessel being frozen in, deems it advisable to sail, he shall be at liberty to leave without cargo, in which case the charter shall be canceled forthwith and the master shall advise the charterers by telegram accordingly, or to leave with part cargo and to fill up for vessel's benefit at any port for any port or ports whether such ports are in the course of the chartered voyage or not; but in case of leaving with part cargo the vessel shall deliver such part cargo at its port of delivery or shall, without undue delay, forward it thereto and there deliver it in accordance with this charter.

(*e*) Clauses 8 (*a*), (*b*), (*c*), and (*d*) shall not apply in the spring.

(*f*) In the spring the charterer's liability to load shall not commence until the navigation of lighters between the shipper's wharf and/or quay and the vessel is entirely unimpeded by ice.

9. (*a*) If the cargo can not be loaded and/or discharged by reason of a strike or lockout of any class of workmen essential to the loading and/or discharge of the cargo or by reason of epidemics, the time for loading and/or discharging shall not count during the continuance of such strike or lockout or epidemic (a strike or lockout of the shipper's and/or consignees' men only shall not exonerate them from any demurrage for which they may be liable under this charter if by the use of reasonable diligence they could have obtained other suitable labor), and in case of any delay by reason of the before-mentioned causes, no claim for damages shall be made by the shipper, the consignees of the cargo, the owners of the ship, or by any other party under this charter.

(*b*) If there is a strike or lockout interfering with the loading of the cargo at the loading port or ports when the vessel is ready to proceed to the first loading port from her last outward port of discharge or from her bunkering port, if in ballast, the shipowner shall, after the vessel has waited three consecutive calendar days, have the option, which shall be declared by telegram to the charterers, of sending the vessel to the loading port or canceling the charter forthwith.

(*c*) If a strike or lockout affecting the loading of the cargo exists at the loading port on the vessel's arrival there or commences before any cargo has been loaded and continues for six consecutive calendar days from the time of the vessel's arrival, the charter shall be canceled forthwith.

(*d*) If a strike or lockout occurs at the loading port after part cargo has been loaded, and continues for six consecutive calendar days, the vessel may proceed with the cargo then aboard, having liberty to fill up for vessel's benefit at any other port or ports either for the same destination or for any other port or ports whether any of such ports are in the course of the chartered voyage or not, and the shipowner shall advise the charterers by telegram that the vessel has left the port.

10. The bills of lading shall be prepared in the form indorsed upon this charter, and shall be signed by the master, quality, condition, and measure unknown, freight and all terms, conditions, clauses, and exceptions as per this charter. The owners shall be responsible for the number of pieces signed for by the master or his duly authorized agents, but not for any cargo which is lost or destroyed while lying alongside the vessel in lighters waiting shipment. In case of any such loss or destruction the master shall furnish proof thereof.

The shipowner shall not be responsible for broken bundles unless due care is not taken both in loading and discharging.

In the event of there being only one consignee all cargo on board shall be delivered to him.

11. The master shall not be obliged to sign more than one set of bills of lading, unless due written notice be given him before commencing to load. Not more than ------ sets of bills of lading shall be required. Further, the cargo shall be sent alongside in such a manner as to enable the master to keep separate the cargo under each bill of lading. Parcels of 50 standards or less for which a separate bill of lading is required shall be delivered to the vessel at one and the same time so as to enable the master to make one stowage of that parcel in the vessel unless part is stowed on deck. For the master's information, but without obligation upon the shipowner, the charterers shall supply the shipowner or his agent with a copy of their "loading instructions to the shipper" as soon as issued.

12. The shipowner shall not be liable for loss or damage arising or resulting from unseaworthiness unless caused by want of due diligence on the part of the shipowner to make the ship seaworthy, and to secure that the ship is properly manned, equipped, and supplied, and to make the holds and all other parts of the ship in which goods are carried fit and safe for their reception, carriage, and preservation. The shipowner shall not be responsible for loss or damage arising or resulting from: Act, neglect, or default of the master, mariner, pilot, or the servants of the shipowner in the navigation or in the management of the ship; fire, unless caused by the actual fault or privity of the shipowner; perils, dangers, and accidents of the sea or other navigable waters; act of God; act of war; act of public enemies; arrest or restraint of princes, rulers, or people, or seizure under legal process; quarantine restrictions; act or omission of the shipper or owner of the goods, his agent or representative; strikes or lockouts or stoppage or restraint of labor from whatever cause, whether partial or general; riots and civil commotions; saving or attempting to save life or property at sea; wastage in bulk or weight or any other loss or damage arising from inherent defect, quality, or vice of the goods; insufficiency of packing; insufficiency or inadequacy of marks; latent defects not discoverable by due diligence; any other cause arising without the actual fault or privity of the shipowner, or without the fault or neglect of the agents or servants of the shipowner.

13. The vessel shall have liberty to sail with or without pilots, to call at any ports in any order for coal or other supplies or for any purpose of any kind whatsoever, to tow and be towed, to assist vessels in distress, and to deviate for the purpose of saving life or property.

14. (*a*) If the nation under whose flag the vessel sails shall be at war, whereby the free navigation of the vessel is endangered, or if prohibition of export or blockade prevent the loading or completion of cargo, this charter shall be canceled forthwith at the last outward port or at any subsequent period when the difficulty may arise.

(*b*) The ship shall have liberty to comply with any orders or directions as to departure, arrival, routes, ports of call, stoppages, destination or otherwise howsoever given by the government of the nation under whose flag the vessel sails or any department thereof, or any person acting or purporting to act with the authority of such government or of any department thereof, or by any committee or person having, under the terms of the war risk insurance on the ship, the right to give such orders or directions and if by reason of and in compliance with any such orders or directions anything is done or is not done, the same shall not be deemed a deviation.

15. The shipowner's liability shall cease at the port of discharge when the cargo is discharged at the ship's rail if discharged by hand or within reach of the ship's tackle or shore crane tackle if thereby discharged (the shipowner having the option of using ship's tackle or shore crane where permissible by local regulations). The cargo shall, however, be discharged by the vessel in the customary manner as fast as the vessel can deliver during the ordinary working hours of the port, onto the quay and/or into lighters and/or craft and/or rafts and/or wagons and/or onto bogies and thereon stowed and/or stacked as customary at the port of discharge, the consignees having the right to select any one or more of these alternatives if customary and available at the time of discharge. For any work done by the vessel at the port of discharge beyond delivering cargo at the ship's rail if discharged by hand, or within reach of the ship's tackle or of the shore crane tackle if thereby discharged, the consignees shall pay to the shipowner the cost thereof plus 15 per cent on the amount thereof and in addition the charge for workmen's compensation insurance. If the port of discharge is included in the schedule of apportionment last agreed between the Chamber of Shipping of the United Kingdom and the Timber Trade Federation of the United Kingdom the charge for such work shall be as settled by the said schedule of apportionment plus 15 per cent on the amount of such charges, and in addition the charge for workmen's compensation insurance, all of which are agreed at the amount stated in clause 16 hereof. In the execution of any work done beyond discharging cargo at the ship's rail or within reach of the ship's tackle or shore crane tackle, as the case may be, the shipowner shall act as a stevedore with the liabilities only of such and not further or otherwise, but the shipowner

shall not be liable for damage by fire, even though caused by the act or neglect of the shipowner or his servants or of any person for whom he is responsible.

16. The apportionment of the sum(s) mentioned in clause 1 as between freight and the said charges is as follows:

	Freight in full of all port charges and pilotages			Charges[1] (if delivered on to the quay, or otherwise where the charges are not more than for delivery on to the quay) for consignees' account under clause 15, in accordance with the said schedule of apportionment, including 15 per cent and workmen's compensation insurance.			
	£	s.	d.	£	s.	d.	
For deals and battens							Per St. Petersburg Standard Hundred of 165 cubic feet.
For boards							Do.
For boards under 1 inch thick							Do.
For scantlings							Do.
For slatings							Do.
For laths							Do.
For staves							Do.
For planed boards and/or floorings							Do.
For ends	2 per cent of the entire cargo (including deck load) at two-thirds freight, and any in excess of this at full freight.			The same as for other lengths of the respective descriptions of cargo.			Do.
For firewood							Per cubic fathom of 216 cubic feet.
				If the port of discharge is not included in the schedule of apportionment, the charges (if any) under clause 15 shall be paid in addition to the freight above mentioned.			

17. If discharged in a dock in London the consignees shall pay two-thirds of the dock dues.

18. If vessel discharges at Sharpness Docks the cargo shall be discharged at the average rate of ------ St. Petersburg standards per weather working day.

19. Should the vessel not be loaded or discharged with dispatch in the manner herein provided whereby the vessel is detained demurrage shall be paid at ------ pounds sterling per day and pro rata for any part of a day.

20. The freight and charges (if any) payable by the consignees under clause 15 shall be paid in cash less advance freight (if any), as follows:

In respect of all goods discharged to craft (except goods discharged at Sharpness Docks for lighterage to Gloucester) 50 per cent shall be paid upon vessel's commencing discharge and the balance before delivery of such goods. In respect of deck cargo discharged otherwise than to craft 50 per cent shall be paid upon vessel's commencing discharge, a further 40 per cent before delivery of such goods, and the remainder upon final outturn being ascertained. In respect of all goods other than those aforesaid (including goods discharged to craft at Sharpness Docks for lighterage to Gloucester) 50 per cent shall be paid upon vessel's commencing discharge and 30 per cent upon breaking bulk in the hold; a further 10 per cent shall be paid before completion of discharge, and the remainder upon final outturn being ascertained, without prejudice to the shipowner's right to exercise his lien under clause 22. These percentages shall be calculated upon the quantity of cargo on board the vessel upon arrival at destination.

21. General average, if any, shall be settled according to the York/Antwerp rules, 1924.

---

[1] At ports where, according to the schedule of apportionment there are no charges payable by the consignees under clause 15, insert "Nil."

22. The master or shipowner shall have an absolute lien upon the cargo for all freight, dead freight, demurrage, average, and charges under clause 15.

23. A letter may be substituted for a telegram wherever required herein if it be sent so as to arrive as speedily.

24. Notice of any claim under this charter or under any bill of lading given hereunder must be given within 12 months of the date of the vessel's arrival at final port of discharge otherwise all claims shall be deemed to be waived.

25. ------ per cent brokerage upon the amount of the freight, dead freight, and demurrage is due by the shipowner upon shipment of cargo, to A. E. Martin & Co. (Ltd.), of London, ---------- by whom the vessel shall be reported at the customhouse if discharged at that port.

26. The penalty for nonperformance of this agreement shall be proved damages not exdeeding the estimated amount of freight.

FORM OF "MERBLANC" CHARTER

Code name: "MERBLANC"

CHAMBER OF SHIPPING WHITE SEA WOOD CHARTER TO THE UNITED KINGDOM, 1899

------------------------, 19--.

IT IS THIS DAY MUTUALLY AGREED between ----------, owners of the good steamship called the ----------, of ------ tons net register, or thereabouts, and of ------ St. Petersburg standards, the shipowner having a margin of 7½ per cent, more or less, up to 750 standards, and 5 per cent on any further quantity above the 750 standards, but not exceeding 75 standards in any case, ---------- master, now ---------- and ---------- of ---------- charterers.

1. That the steamship, being tight, staunch, and strong, and every way fitted for the voyage, shall with all convenient speed (having liberty to take cargo for owner's benefit, either direct or to any port or ports on the way, or to --------------------), and after discharge of same, sail and proceed to ----------, or so near thereunto as she may safely get, and there load, always afloat, from the agents of the said charterers, a full and complete cargo of mill-sawn deals and/or battens and/or boards and/or scantlings and/or ends (boards and scantlings together not to exceed ---------- standards, battens not to exceed ---------- standards, and ends not to exceed ---------- standards), with a sufficient quantity of ends, 11 feet and under, for broken stowage only. (Memo: Owners may agree any other description of cargo. Owners may agree to expunge the words "always afloat" at loading and/or discharging ports, or agree a special lighterage clause for shallow ports or places.)

The steamer to be provided with a deck load, at full freight, at charterers' risk, not exceeding what she can reasonably stow and carry, over and above her tackle, apparel, provisions, and furniture; and being so loaded shall therewith proceed to ----------, or so near thereunto, as she may safely get, and deliver the same, always afloat, on being paid freight as follows:

	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
For deals and battens,[1] and deal and batten ends for cargo, per St. Petersburg standard hundred of 165 cubic feet												
For boards and board ends for cargo, per St. Petersburg standard hundred of 165 cubic feet												
For boards and board ends for cargo, per St. Petersburg standard hundred of 165 cubic feet, under 1 inch thick												
For scantlings and scantling ends for cargo, per St. Petersburg standard hundred of 165 cubic feet												
For ends for broken stowage 11 feet and under, per St. Petersburg standard hundred of 165 cubic feet	Two-thirds freight			Two-thirds freight			Two-thirds freight			Two-thirds freight		

---

[1] Battens to be considered 2 by 4 inches and up to 3 by 7 inches.

Should more ends be shipped than are intended for broken stowage, then 5 per cent of the cargo to pay two-thirds freight. ------------- in full of all port charges and pilotages.

2. The master or owners to telegraph the shippers of the cargo (telegraphic address as per margin), giving the charterers' names, and giving at least 10 days' notice of the probable date of steamer's arrival at the loading port. Default of this not to be considered a breach of charter, but charterers not to be responsible for delay in loading caused by such default of the master or owners.

3. The cargo to be loaded and discharged with customary steamship dispatch, as fast as the steamer can receive and deliver during the ordinary working hours of the respective ports but according to the custom of the respective ports, Sundays, general or local holidays (unless used), in both loading and discharging excepted. Should the steamer be detained beyond the time stipulated as above for loading or discharging, demurrage shall be paid at ------ pounds per day, and pro rata for any part thereof. The cargo to be brought to and taken from alongside the steamer at charterers' risk and expense as customary. The master has liberty to bring iron or other dead weight as ballast from the loading or any other port. (Memo: Owners may arrange for a fixed average number of standards per day for loading and/or discharging.)

4. Sufficient cash for steamer's ordinary disbursements to be advanced the master, if required by him, at port of loading, on usual terms.

5. If the cargo can not be loaded and/or discharged by reason of a strike or lockout of any class of workmen essential to the loading and/or discharge of the cargo, or by reason of epidemics, the time for loading and/or discharging shall not count during the continuance of such strike or lockout or epidemic (a strike or lockout of the shippers' and/or receivers' men only shall not exonerate them from any demurrage for which they may be liable under this charter if by the use of reasonable diligence they could have obtained other suitable labor), and in case of any delay by reason of the before-mentioned causes, no claim for damages shall be made by the shippers, the receivers of the cargo, the owners of the ship, or by any other party under this charter.

6. The bills of lading to be prepared on the form indorsed on this charter, and shall be signed by the master, quality, condition, and measure unknown, freight and all conditions, causes, and exceptions as per this charter. The owners shall be responsible for the number of pieces signed for by the master or his duly authorized agents, fire and fraud excepted. Perils of the seas and rivers when the cargo is in lighters, also excepted.

7. The act of God, the King's enemies, restraints of princes and rulers, and perils of the seas excepted. Also fire, barratry of the master and crew, pirates, collisions, strandings and accidents of navigation, or latent defects in, or accidents to, hull and/or machinery, and/or boilers, always excepted, even when occasioned by the negligence, default, or error in judgment of the pilot, master, mariners, or other persons employed by the shipowner, or for whose acts he is responsible, not resulting, however, in any case from want of due diligence by the owner of the ship, or by the ship's husband or manager. The steamer has liberty to call at any ports in any order, to sail without pilots, to tow and assist vessels in distress, and to deviate for the purpose of saving life or property, and has liberty to coal at any port or ports, without prejudice to this charter.

8. Should ice (except in the spring) effectually prevent the steamer getting into the port of loading, this charter to be null and void; and if during the loading (except in the spring) ice should make it dangerous to complete the cargo, the master shall have liberty to sail with what cargo he has on board, with the option of filling up at a port or ports on the way home, for a port or ports on the way to, or for the port of discharge under this charter party for owners' benefit. If the nation under whose flag the steamer sails shall be at war, whereby the free navigation of the steamer is endangered, or if prohibition of export or blockade prevent the loading or completion of the cargo, this charter shall be to such extent null and void at the last outward port of delivery or at any subsequent period when the difficulty may arise.

9. The freight to be paid in cash without discount (less freight advance if any) on unloading and right delivery of the cargo.

10. The master not to be obliged to sign more than one set of bills of lading, unless due written notice be given him before commencing to load, and the cargo to be supplied so as to enable him to keep separate the different consignments. Not more than [7] ---------- sets bills of lading shall be required.

---

[7] The number to be filled in at the time of chartering.

11. In case of average the same to be settled according to the York/Antwerp rules, 1890, excepting that jettison of deck cargo (and the freight thereon) for the common safety shall be allowed as general average.

12. If discharged in a dock in London the consignees to pay two-thirds of the dock dues.

13. The steamer to be addressed to the shippers appointed at the port of loading, paying the usual port charges and address money. In case there should be more than one shipper the amount to be divided pro rata.

14. Should any lighterage be required over the bar at Archangel, same to be at charterers' risk but at steamer's expense.

15. If from Onega, the steamer is to load as much cargo in Onega River as she can do in safety, and the balance in Onega Bay.

16. The master or owners to have an absolute lien upon the cargo for all freight, dead freight, demurrage, and average.

17. Penalty for nonperformance of this agreement, proved damages, not exceeding estimated amount of freight.

18. The brokerage is at 5 per cent and is due to ---------- on the signing hereof, and the steamer is to be reported by them at the customhouse at ---------.

While in pre-war years many full cargoes of wood, principally southern pine, were imported from the United States, they have become somewhat of a rarity in recent times and confined almost entirely to the outports, so that to-day, with the exception of the countries named, shipments are almost entirely made on liner bills of lading.

Bills of lading.—In making out bills of lading it is essential to keep in mind that shipping companies can not be called upon to split up bills of lading, therefore it is necessary that separate bills of lading be made out for each portion for which separate delivery may be required. Also a distinctive mark must be placed on each shipment to enable the ships' workers to readily allocate goods to their respective bills of lading. Unfortunately, shippers have in some cases neglected to take these precautions and heavy charges for landing and sorting have been incurred. A little extra trouble in this matter is well repaid.

MARINE INSURANCE

The problems of marine insurance are so vast and complicated that they have become a special branch of the insurance profession and one that would take years of experience to master.

While, therefore, not attempting to discuss the entire question, there are certain points of vital importance to American lumber exporters doing business with the United Kingdom which should be given careful consideration when the insurance contract, or policy as it is called, is drawn up.

Some lumber contracts, such as the "Albion" used for north European softwoods, call for insurance to be effected in accordance with the Timber Trade Federation clauses which are incorporated and made a part of the contract. As far as American hardwoods and softwoods are concerned, however, there are no rules as to what must be covered except that sometimes the amount is given, but unless the shipper has included full coverage of every insurable risk in the policy furnished, he is liable to find himself called upon to make good any loss or damage sustained thereby.

AMOUNT OF COVERAGE

The amount of coverage differs, but most contracts require the full c. i. f. value of the shipment, plus 10 per cent for imaginary profits, to be insured for the buyers' benefit.

Inasmuch as the freight is not payable until after arrival of the vessel and due delivery of the goods, it might be thought that to insure the f. o. b. value is sufficient. This is a common mistake, for although the freight may not be at risk, yet the risk of damage to the shipment is always present, and if after freight has been earned and the value of the goods necessarily increased to that extent, then the proportionate damaged value will be considerably greater. As an illustration, let it be supposed that goods are badly damaged in transit and a claim is filed against the insurance company. If only the f. o. b. value has been insured the buyer can not take into account the freight which he has had to pay, but only the insured value is taken into consideration in adjusting the claim. As a result, the question immediately arises as to who is liable for the difference between the value of the insurance policy and the amount of the buyer's claim, and as it can not be claimed from the underwriters, the buyer looks to the shipper to reimburse him. Where, therefore, the contract does not stipulate the amount to be covered, American exporters, if they are to avoid carrying the risk of that part of the value represented by freight, should insure either the c. i. f. value, plus 10 per cent, or the f. o. b. value, plus 10 per cent, and the freight as well.

There is also a clause which does, to a certain extent, overcome some of the difficulties regarding insurance being effected for the f. o. b. value only, reading as follows:

> In consideration of the declaring of a separate amount of insurance sufficient to cover freight and charges payable on delivery, it is agreed that in the event of a claim for particular average same is to be based on a comparison of the net sound and damaged values after deduction of freight and charges payable at destination. It is distinctly understood and agreed, however, that this clause is only operative in event of claim for particular average, and in the event of a claim for total loss this company is only to be liable for the insured value of the merchandise insured, as provided herein, and expenses, and in no event is this clause to be operative unless a separate amount sufficient to cover the freight and charges payable on delivery is declared at the time of issuance of this certificate.

With this clause particular average loss would then be adjusted on a basis of loss ascertained after deduction of freight and charges from both the sound and the damaged value.

"OPEN" FORM OF POLICY

Many exporters insure their shipments under a form of contract known as an "open" policy, this form being largely used in the United States lumber trade. Under this form of cover a separate policy is not issued for each shipment, but a certificate is issued by the assured stating that a certain declaration has been made on the policy, which certificate is now generally accepted by most of the banks and the import trade.

TYPICAL POLICY

A typical marine insurance policy reads as follows:

Be It Known That ---------- as well in their own name, as for and in the name and names of all and every other person or persons to whom the same doth, may, or shall appertain, in part or in all, doth make assurance and cause themselves and them and every of them, to be insured, lost or not lost, at and from ---- upon any kind of goods and merchandises, and also upon the body, tackle, apparel, ordnance, munition, artillery, boat and other furniture, of and in the good ship or vessel called the ----------, whereof is master, under God, for this present voyage, ----------, or whosoever else shall go for master in the said ship, or by whatsoever other name or names the same ship, or the master thereof, is or shall be named or called, beginning the adventure upon the said goods and merchandises from them loading thereof aboard the said ship as above ------ upon the said ship, etc., as above ----------, and shall so continue and endure, during her abode there, upon the said ship, etc., and further, until the said ship, with all her ordnance, tackle, apparel, etc., and goods and merchandises whatsoever, shall be arrived at as above upon the said ship, etc., until she hath moored at anchor 24 hours in good safety, and upon the goods and merchandises until the same be there discharged and safely landed, and it shall be lawful for the said ship, etc., in this voyage to proceed and sail to and touch and stay at any ports or places whatsoever and wheresoever for all purposes without prejudice to this insurance. The said ship, etc., goods and merchandises, etc., for so much as concerns the assured, by agreement between the assured and assurers in this policy, are and shall be valued at ------.

Touching the adventures and perils which we, the assurers, are contented to bear and do take upon us in this voyage, they are, of the seas, men-of-war, fire, enemies, pirates, rovers, thieves, jettisons, letters of mart and countermart, surprisals, takings at sea, arrests, restraints, and detainments of all kings, princes, and people, of what nation, condition, or quality soever, barratry of the master and mariners, and of all other perils, losses, and misfortunes that have or shall come to the hurt, detriment, or damage of the said goods and merchandises and ship, etc., or any part thereof; and in case of any loss or misfortune, it shall be lawful to the assured, their factors, servants, and assigns, to sue, labor, and travel for, in and about the defense, safeguard, and recovery of the said goods and merchandises and ship, etc., or any part thereof, without prejudice to this insurance; to the charges whereof we, the assurers, will contribute, each one according to the rate and quantity of his sum herein assured. And it is especially declared and agreed that no acts of the insurer or insured in recovering, saving, or preserving the property insured shall be considered as a waiver or acceptance of abandonment. And it is agreed by us, the insurers, that this writing or policy of assurance shall be of as much force and effect as the surest writing or policy of assurance heretofore made in Lombard Street, or in the Royal Exchange, or elsewhere in London.

Warranted free of capture, seizure, arrest, restraint, or detainment, and the consequences thereof or of any attempt thereat (piracy excepted), and also from all consequences of hostilities or warlike operations whether before or after declaration of war.

Should the above clause be deleted, the following clause is to operate as part of this policy:

Warranted free of any claim based upon loss of, or frustration of, the insured voyage, or adventure, caused by arrests, restraints, or detainments of kings, princes, or peoples.

And so we the assurers are contented, and do hereby promise and bind ourselves, each one for his own part, our heirs, executors, and goods, to the assured, their executors, administrators, and assigns, for the true performance of the premises, confessing ourselves paid the consideration due unto us for this assurance by the assured, ---------- at and after the date of ----------.

In witness whereof we, the assurers, have subscribed our names and sums assured in London.

N. B.—Corn, fish, salt, fruit, flour, and seed are warranted free from average, unless general, or the ship be stranded; sugar, tobacco, hemp, flax, hides, and skins are warranted free from average under 5 pounds per cent; and all other goods, also the ship and freight, are warranted free from average under 3 pounds per cent, unless general, or the ship be stranded.

(In the event of accident whereby loss or damage may result in a claim under this policy, the settlement will be much facilitated if immediate notice be given to the nearest agent.)

Such a policy, however, is not sufficient, and, in order to meet the requirements of special trades, such as lumber, certain additional clauses are required. It is these clauses with which the American lumber exporter is concerned, a brief résumé of the more important of which is covered in the succeeding paragraphs.

"With particular average" clause.—It is advisable that goods be covered W. P. A. (with particular average) and not F. P. A. (free of particular average), unless the latter terms are specifically agreed upon between the seller and buyer. The reason for this is that there is a definite risk of damage taking place while the goods are en route, which damage might not be attributable to negligence on the part of the carriers, and which might be attributable to "perils of the sea."

Probably with particular average insurance in its ordinary form—that is to say, insurance against perils of the seas with a franchise of 3 per cent applied to each invoice and/or shipment—would suffice to comply with the ordinary c. i. f. terms of sale. However, to a considerable extent the trade in the United Kingdom has become accustomed to insurance clauses which have come to be known as the Timber Trade Federation insurance clauses. Insurance in this form is being written by a number of companies in the United States, and a copy of these clauses is attached hereto. Such policies may be issued specifically to include a number of other than ordinary sea perils, notably fresh water, ship's sweat, theft, and pilferage. It is, however, to be borne in mind that no marine insurance, however broad in its terms, covers what is known as inherent vice—that is, damage arising from causes within the goods themselves.

Journey covered.—It is essential that the policy include the warehouse to warehouse clause (and this will be found to be incorporated in the lumber clauses herewith). The effect of this clause is that the goods are covered continuously from the original point of shipment, whether in the interior or at the seaport, while they are in due course of transit, until arrival at warehouse or premises of the consignee.

War and strike risks.—It is advisable to insure against war risk, which includes, also, floating or stationary mines. Although this risk is now very remote, the additional premium charged therefor is nominal. Many buyers will also expect to be covered against loss or damage caused by strikers, locked-out workmen, or persons taking part in riots or civil commotions, and this clause may be extended also to cover the cost of reforwarding to their proper destinations, shipments which because of strikes, riots, or civil commotions, it is impossible for the ship to deliver at the port originally intended. This extension of the strike risk clause is granted in consideration of an additional premium.

Deviation of voyage owing to strikes, riots, etc.—Another point which is of importance is that it is advisable to cover the expenses and charges incurred in the event of goods having been landed at a destination other than that shown in the bill of lading, owing to strikes or similar occurrences. All bills of lading permit a vessel, in the event of certain circumstances, to deliver its goods to a certain-named port or as close thereto as she may safely get. During the 1926 general strike in Great Britain, which stopped vessels discharging at British ports, some took their cargoes to Rotterdam and landed them there, it being the nearest port to London where a vessel could safely land. It is, therefore, essential that the following or a similar clause be incorporated in the policy:

Including risks of strike, riots, and civil commotion. The underwriters agree to pay landing, warehousing, forwarding, and other transportation expenses incurred by reason of merchandise being carried to a port other than called for in the bill of lading, which is due to causes covered in the strikes and riots clause.

Sweat damage.—While goods can be discolored before being put on board the vessel, provided there is no notification on the bill of lading to this effect it may be possible to recover the damage caused by discoloration.

The ordinary policy does not include such a clause, and in order that he may be protected against loss on this account the shipper should insure against damage owing to "fresh water, sweat, steam of hold, hook damage, and contact with oil or other cargo," on "with average terms" or, if this is too costly, if amounting to a 3 per cent average franchise stipulated thereon. Under this form of policy it is possible to recover loss from such causes from the underwriters, leaving them to proceed against the carrier if a case for action lies against them.

Many heavy claims are paid in the course of a year by American lumber exporters for discoloration, but if steps were taken to see that a "sweat" clause were included in their marine-insurance policy many thousands of dollars would be saved.

LUMBER CLAUSES

Interior and/or shore risk.—Including all risks from the time of leaving the mill, warehouse, factory, yard, or premises in the interior while in transit by land and/or water to the port of loading; while awaiting shipment and until delivered on board the ocean-going vessel; while in shed or on wharf or quay after discharge at port of destination; and while in transit by land and/or water to the mill, warehouse, factory, yard, or premises at destination and until safely delivered therein. Risk in shed or on wharf or quay at port of destination not to exceed 30 days from the time the vessel has completed the discharge of her entire cargo, or held covered if required by assured at a premium to be arranged. Should clause No. 1 be deleted, clause No. 2 is to operate as part of this policy.

Including all risks while in due course of transit by land and/or water from the time of leaving mill, warehouse, factory, yard, or premises at the place from which the goods are conveyed to the ocean-going vessel; while awaiting shipment and until delivered on board the ocean-going vessel; while in shed or on wharf or quay after discharge at port of destination; and while in due course of transit by land and/or water to the mill, warehouse, factory, yard, or premises at destination and until safely delivered therein. Risk in shed or on wharf or quay at port of destination not to exceed 30 days from the time the vessel has completed the discharge of her entire cargo, or held covered if required by assured at a premium to be arranged.

In the event of this interest or any portion of it being carried on beyond the port of destination, it is agreed to hold the assured covered until final arrival at port of destination.

Including all risks of transshipment and/or of landing, while on shore, and of reshipment, wherever incurred.

Including all risks incidental to steam navigation.

Including all risks of craft and raft to and from the vessel. The assured are not to be prejudiced by an agreement, exempting lightermen from liability.

Including risks of theft and pilferage, irrespective of percentage

To include risk of jettison and washing overboard.

Including risks of negligence, default, or error in judgment of the pilot, master, mariners, engineers, or others of the crew, or stevedores or other persons employed by the shipowner, or for those acts, he is responsible.

Including all liberties, clauses, and conditions as per bill or bills of lading and/or charter party or contract of affreightment.

Seaworthiness admitted.

With leave to call at any port or place, in or out of the customary route in any rotation for any purpose, to sail with or without pilots, to tow or to be towed, to assist vessels in all situations or to render salvage services.

Any deviation from the terms and conditions of this policy, or change of voyage, or additional risk not specified, or any omission or error in the description of the interest, vessel, or voyage, to be held covered at a premium to be arranged.

Cargo on deck is warranted free from particular average, and cargo under deck is warranted free from particular average under 3 per cent, but both these warranties are subject to the following exceptions:

(*a*) Unless the vessel or craft or raft be stranded, sunk, or burned.

(*b*) To pay the insured value of any portion of the cargo which may be totally lost in loading, transshipment, or discharge.

(*c*) To pay any loss of or damage to the interest insured which may reasonably be attributed to fire, collision, or contact of the vessel and/or craft and/or raft and/or conveyance with any external substance (ice included) other than water, or to discharge of cargo at a port of distress.

(*d*) To pay any loss irrespective of percentage arising from jettison or washing overboard or partial loss from raft, or craft and/or from slings.

(*e*) To pay landing, warehousing, forwarding, and special charges if incurred.

Each craft and/or raft and/or deck load and/or each bill of lading or deck load of each bill of lading to be deemed a separate insurance if required by assured.

In consideration of the declaring of a separate amount of insurance sufficient to cover freight and charges payable on delivery, and the payment of a premium thereon at a rate equal to one-half of the rate charged on the merchandise itself, it is agreed that in the event of a claim for particular average same is to be based on a comparison of the net sound and damaged values after deduction of freight and charges payable at destination. It is distinctly understood and agreed, however, that this clause is only operative in event of claim for particular average, and in event of a claim for total loss this company is only to be liable for the insured value of the merchandise insured, as provided herein and expenses, and in no event is this clause to be operative unless a separate amount, sufficient to cover the freight and charges payable on delivery, is declared at the time the certificate covering the shipment is issued.

Losses hereunder to be settled according to English law and custom.

General average and salvage charges payable according to (*a*) foreign statement if so claimed, or (*b*) as per York and Antwerp rules, or as per York and Antwerp rules, 1890, if in accordance with the contract of affreightment, or (*c*) as per York and Antwerp rules, or York and Antwerp rules, 1890, excluding rule 1, if in accordance with the contract of affreightment.

Warranted free of capture, seizure, arrest, restraint of detainment, and the consequences thereof or of any attempt thereat (piracy excepted) and also from all consequences of hostilities or warlike operations whether before or after declaration of war.

Warranted free of loss or damage caused by strikers, locked-out workmen, or persons taking part in labor disturbances, riots, or civil commotions. Should the clause of capture, seizure, arrest, etc., be deleted, the frustration clause as stated below to operate as part of this policy.

Warranted free of any claim based upon loss of, or frustration of, the insured voyage, or adventure, caused by arrests, restraints or detainment or kings, princes, or peoples.

Conclusions.—While the matters discussed do not cover the entire insurance problem, they do cover the main points on which a lumber exporter should be protected. The premium is so small that it seems poor business judgment for any shipper to carry an insurable risk when he can at little cost pass it on to his underwriters.

Insurance in the form heretofore described will, no doubt, be acceptable to buyers in the United Kingdom, but as an extra precaution it would, of course, do no harm if American lumber exporters submitted their policies to their British agents and obtained their approval thereof.

CLAIMS

As long as lumber is exported there will probably be claims, and this fact might just as well be recognized at the start. Lumber is a natural product and does not grow according to rules, neither is its grading an exact science, but the application of such rules must be largely a matter of judgment of the inspector who, qualified by knowledge and experience, has been selected to do the work.

Contract stipulations to be avoided.—There are, however, certain claims that can be avoided if the shipper refuses to agree to stipulations where personal opinion is involved or promises impossible of fulfillment agreed to.

In these classes are such clauses frequently inserted in contracts as "*reasonably* dry and bright," "equal in quality to shipment per S. S. ----------," "dry," "a fair shipment of the season's average," etc.

In this connection, a prominent London agent told the writer of once being asked to act as arbitrator in a dispute that had arisen over a shipment of American hardwood lumber. On examining the contract he noticed a clause stating the quality was "to be equal to the shipment per S. S. ----------." On going into the matter it developed that about two years previously the importer had purchased a carload of oak lumber with which he had been very pleased, ever since that time succeeding contracts with the shipper in question had contained the clause quoted. All had gone well until this particular shipment and the buyer had now made a claim for quality. "Well," said the agent, "I shall be glad to act as sole arbitrator provided you show me the original car by which I can compare the one in dispute." Untold trouble is caused by such matters, of which this is only one illustration. All special stipulations should be avoided and only lumber graded in accordance with established rules agreed to be furnished.

Danger of shipping overgrade.—Another dangerous practice in the export trade is that of furnishing a better grade of lumber than called for by the contract. This usually occurs with a newcomer to a particular market anxious to make a good impression with his early shipments; but it is a practice strongly to be discouraged, as a standard is thereby set which it is impossible to live up to, and disappointed customers, if nothing worse, are bound to result.

There is an actual case of an American exporter who shipped lumber rather overgrade at an enhanced price and then, after a while, shipped another parcel strictly to grade. An arbitration was held and it was decided that the buyer was entitled to expect what the shipper had formerly been in the practice of supplying and the award was against the shipper.

Shippers' liability under c. i. f. contract.—To those not thoroughly familiar with the export trade it might be thought that an exporter under a c. i. f. contract has fulfilled his part once the goods have been supplied, an approved certificate of insurance and contract of affreightment furnished. This idea is the cause of much controversy in the lumber trade because, while this may be the legal interpretation of a c. i. f. contract although it is not the intention to give this here, it must be remembered that customs of the trade are the final arbitrators in British law courts, and buyers in London claim that by the custom of the hardwood trade a c. i. f. contract does not bear this interpretation, more particularly when the payment clause reads "to be paid for within one month from date of arrival of vessel, etc."

Exporters' liability under a c. i. f. contract for damage to lumber caused through deterioration during the voyage is one frequently discussed when a claim for discoloration has been made, and although an exporter may claim his liability ceased when he has furnished proper evidence of shipment, insurance, etc., the following opinion of a prominent English lawyer is worthy of consideration:

> Under a c. i. f. contract the risk of voyage is on the buyer, and he looks either to his underwriters on the policy or to the shipowner under his bill of lading for any claim for damage, subject to the proviso that, in shipping the goods, the seller has taken all reasonable precaution in seeing that they are shipped in such a condition that they will stand the voyage to the place for which they are intended—that is to say, the goods must not only be outwardly in good condition but must in fact be able to stand the voyage to their destination without sustaining damage apart from extraneous reason.

From this statement it appears that, although lumber may apparently be in good condition at time of shipment, it must actually be in condition to stand the voyage without discoloration, except for outside causes, if the exporter is to be free from responsibility. Damage caused through "sea perils," however, can not be collected

from the vessels but constitutes an insurable risk, and exporters should be careful to protect themselves by covering it in their marine policy.

Buckled and twisted lumber.—Much controversy has been caused over buckled and twisted American hardwood lumber, particularly gum and oak. From the nature of these defects it is rarely possible for the carriers' or the buyers' drayman or lighterman to notice these faults and clean documents are issued. The trouble is not discovered until the lumber reaches the buyers' premises, and unless negligence can be proved against the carriers, no claim could rest against them. Neither will the underwriters bear the claim unless it can be shown to be caused by perils of the seas or other insurable risk. Particular care should therefore be taken by American exporters to see that wood of such nature be shipped in such a manner and condition that it can reach its destination safely and should so be seasoned that it has no inherent moisture that will cause such a defect to develop while en route.

INSPECTION OF LUMBER

European lumber.—There are no grading rules governing the inspection of north European and Russian softwoods, but the various grades are so well known that they can readily be established. Neither are there any for either central or other European softwoods or hardwoods, but sales are made on shippers' description and usually marked accordingly.

American lumber.—Lumber from the United States alone is sold on recognized grading rules, those of the National Hardwood Lumber Association for hardwoods, Gulf Coast Classification of the Southern Pine Association for southern pine, while Pacific coast woods, such as Douglas fir and Port Orford cedar, are sold according to the grading rules as published in the "M" list by the Pacific Lumber Inspection Bureau (Inc.), Seattle, Wash.

Japanese lumber.—There are no special rules for Japanese oak and ash, but shipments are expected to approximate to United States rules.

MEASUREMENT OF LUMBER, TIMBER, AND LOGS

LUMBER AND TIMBER

Softwood lumber.—The Petrograd standard of 1,980 feet board measure is the basis of measurement for softwood lumber in the United Kingdom, the contents being extended to three decimal places.

Hardwood lumber.—All American hardwood lumber is measured by the "American board measure" rule. Boards 1 inch and under in thickness are considered as 1 inch and computed to face measure, those over 1 inch in thickness are computed by the rule giving face contents, the total being multiplied by the thickness.

The system for selling European hardwoods is by customs system, 2 inches and up in thickness being measured to the ¼ foot in length, ¼ inch in width and thickness, and contents computed to the foot cube and tenths, fractions of tenths being dropped.

Lumber 1¾ to 1 inch is taken to superficial feet of 1 inch and computed to the superficial foot, in some cases to the ½ superficial foot.

Under 1 inch is taken at superficial feet, irrespective of thickness. Some importers here will instruct the measuring authorities to measure oak planks customs system for selling purposes.

Timber.—For sawn and hewn square timber (mahogany excepted, which is covered in the section on "Woods used") what is known as King's caliper measure is generally used. By this system the sides of the piece are measured with calipers to inches and quarters of an inch, the length taken to the half foot and actual contents computed to the half cubic foot by means of the 144 divisor.

LOGS

Liverpool string measure "Hoppus" system.—Logs such as ash, hickory, and poplar, are sold "Liverpool string measure, Hoppus system." To obtain the contents of a log by "Liverpool string measure," the measurement is taken in the middle of the log and the method used is as defined by "Customs in the trade" issued by the Liverpool Timber Trades Association as follows:

> All timber in the log as at present sold on Liverpool string measure shall be sold and measured ¼ inch in girth, ½ foot in length, and be contented out to cubic feet and twelfths, measurers using either a girthing tape or string. Girth is to be ascertained by tape as far as possible, otherwise by string at the option of the seller. In the case of round timber, if measured over bark, allowance to be made for bark ½ inch on 11¾ inches and under, 1 inch on 12 to 17¾ inches, and an additional ½ inch for every 6 inches or part thereof over.

To obtain the contents of a log the "Hoppus" system is used—i. e., the quarter girth is multiplied by itself, the result multiplied by the length and then divided by 144. The final result is in cubic feet. The fraction is further extended by multiplying it by 12 and again dividing by 144, the result of which is known as twelfths.

In London an arbitrary allowance for bark is made for logs measured quarter girth measure by deducting from 7½ to 10 per cent from the contents instead of reducing the quarter girth as at Liverpool.

This method of measuring logs makes it difficult to compare it with the Scribner-Doyle rule, which varies with the size of the individual log, the average being much greater on those having a small diameter. It is the difficulty in estimating this overmeasure which prevents an accurate computation of the net return on log shipments by the American exporter.

Customs string.—Occasionally sales are made on "customs string measure" in which event the method of measurement is the same as Liverpool quarter girth, but in computing the contents the divisor is 113 instead of 144. It is only rarely that American log sales are made on "customs string measure," the usual basis being Liverpool quarter girth measure, "Hoppus" system.

Caliper measure for round logs.—This is sometimes used for carrying purposes, in which event the divisor of 183 is employed, practically equaling customs string system.

PUBLIC MEASURING FACILITIES

The Customs Fund, timber-measuring department, measures all classes of timber for importers, shippers, and shipowners at all British ports. There are, however, certain systems of measuring

which can only be undertaken by wood brokers with a full technical knowledge of the various woods, such as mahogany and fancy hardwoods, to enable them to make suitable allowances to comply with the customs of the trade.

GRADE MARKS AND BRANDING

Practically all lumber imported into the United Kingdom, with the exception of American and some from small central European mills, is grade marked, the brand usually being placed on both ends of the piece. This is most important, because a buyer can always see the ends of a pile while it is not always possible to see the face of the lumber. European shippers attach great importance to their brands and always show them in their advertisements in trade journals. The British importer is also largely influenced by the mark, and at the commencement of the selling season shows preference for the well-known ones and is willing to pay high prices for these even though he will not purchase second-grade stocks at all. Lumber is resold in Great Britain to a great extent by the brand, and as the quantities of certain favorite marks are limited an importer in England will take a risk as regards price. When no particular brand is needed, however, there is no hurry to buy, and unless the price is cheap importers see no reason for running any risks of a falling market.

While American softwood lumber and timber is always branded, few exporters have adopted grade marking, the same mark being used regardless of the quality, and it is seldom shown on the ends where it can be most readily seen.

The practice of grade marking is fairly general in American hardwoods, but they are in most cases put on the face only and consequently are unseen unless specially looked for. Softwood lumber from northern and central Europe is stenciled with various colored inks, while that from the White Sea and Petrograd is hammer branded. As illustrative of the importance attached to the branding of lumber in Great Britain, it might be mentioned that for some unexplained reason the Soviet Government shipped several cargoes of lumber with the brands stenciled instead of hammer branded. A strong protest was immediately made, and the Russian agency issued a statement, that was given the widest publicity in the press, assuring buyers that there was no difference in the system of grading from that practiced in previous years. Assurances were also given that all subsequent shipments would be hammer branded as heretofore.

Value of grade marking.—Perhaps the greatest value of grade marking lumber is the free advertisement received by the shipper. Not only is lumber sorted according to its mark on the dock when it is landed, but, like a person's name, is associated with it until finally disposed of in some consumers' plant.

In addition to advertising the shipper, grade marks also serve as protection against substitution by dishonest or negligent importers or their employees of inferior or discolored lumber.

Last, but by no means least, an established grade mark is the shipper's best salesman, creating a steady demand which benefits not only the American shipper but also the importer who naturally is anxious to meet the demands of his customers. As a result, when next he is in the market, instead of merely asking for quotations on a certain kind of lumber, a particular brand is also called for. Importers and merchants, realizing the sales value of a well-established brand, frequently show it on their stock lists and also in their trade-journal advertisements. It is therefore advisable for American lumber exporters to register their brands and grade marks in order to protect the good will established by the quality of the lumber shipped under them, thus preventing their being copied by others.

CONSIGNMENTS

There is probably no matter on which American lumber exporters are in such complete agreement as the evil of shipping stock abroad unsold, on consignment, yet no sooner does even a slight improvement in demand appear in the British market than consignments, mostly of hardwood lumber, begin to arrive. In this way any benefit that might accrue to the export trade is nullified. Not only, however, is it in times of trade improvement that consignments appear but in times of depression also, thus helping to make a bad situation worse. The shipping of goods on consignment is the poorest possible method of stimulating trade; and if a shipper's agent, who has an intimate knowledge of prevailing conditions and is in close contact with the buyers, is unable to obtain offers it is the height of foolishness for an American shipper to consider his judgment better than the man on the spot and send parcels forward in any event. As may be expected, the results are inevitable—either the stock is sold at a considerable reduction under the market value or it is stored and high charges for landing and rent are incurred. In either event the shipper faces a heavy loss.

Not only, however, does the shipper take a heavy loss, but the whole market for American lumber is weakened and a lower level of prices established.

It might at first sight be thought that British importers favored consignments as giving them an opportunity of purchasing some cheap lumber or the agents to earn a commission, but this is erroneous. The importer naturally covers his anticipated needs by buying for future delivery, so that in order to protect these purchases and also stocks in hand he must purchase these consignments, but by doing so there is danger of his stocks becoming top-heavy, forcing them to be sacrificed to the detriment of the whole market.

Neither do agents care for consignments, because they only add to their difficulty of selling on a firm order basis; the price obtained for them speedily becomes known in the trade and forms the basis of c. i. f. offers. It might be added that another reason for the low offers made for consignments is the fact that many buyers have their own waterside yards, and in buying c. i. f. all landing charges are avoided. These buyers are thus not prepared to pay a price for landed stock that will cover the landing charges, which consequently must have be borne by the shipper.

The whole consignment business is a menace to sound business, and the matter should receive the serious attention of American lumber exporters if they are to obtain the full value of their product in the United Kingdom, and the first step would be to restrict their sales entirely to a firm order basis.

AUCTIONS

Excluding those having to do with mahogany, which are covered under that heading in the section on "Principal woods used in the United Kingdom," sales of lumber by public auction are largely concerned with European softwoods.

As far as American woods are concerned, they form a very small part of the goods offered. Auctions are mainly made use of by merchants and importers for the purpose of disposing of surplus stock on which they wish to realize quickly. The appearance of any particular shipper's brand in an auction catalogue does not necessarily mean that he is the owner of the stock offered or that it was shipped unsold on consignment.

PRINCIPAL WOODS IN THE UNITED KINGDOM

Pine and spruce from northern, eastern, and central Europe compose by far the greater part of the United Kingdom lumber trade, immense quantities being imported from them every year to meet the requirements of the building, box, and packing-case trades. Next in importance among the softwoods are southern pine, Douglas fir, Sitka spruce, and white pine coming from the United States and Canada, for use where size, strength, or particular qualities are required. Oak from the United States, Poland, Japan, and central Europe, and mahogany from west Africa, Central America, the United States, and West Indies, are the most important of the hardwoods; but every variety, whether used for furniture, decorative, or utilitarian purposes, may be found in British importers' yards, and there is probably no other country in the world where so many different kinds of wood are used as in the British Isles.

While space will not allow all of them to be discussed in this bulletin, information pertaining to the principal and also some of the minor woods sold in this market is given.

SOFTWOODS

NORTH EUROPEAN SOFTWOODS

North European softwoods constitute the greater part of the lumber trade of the United Kingdom, practically all being imported in the form of lumber, very little of which is over 4 by 11 inches. During 1925, the imports amounted to 3,940,314 loads of 600 feet board measure, valued at £18,894,724. Of this quantity, 3,404,146 loads were of rough lumber and 536,168 loads were flooring and other dressed stock (for particulars of dressed stock see chapter on Planing-Mill Products) which was imported almost entirely in full cargoes of wood, little moving on general cargo liners. With the exception of small quantities of Russian larch, all of these imports are pine, called "redwood" and sometimes "yellow," and spruce, called "whitewood" in the British lumber trade. It is estimated that from 75 to 80 per cent is pine, the balance spruce.

Finland, Sweden, northern Russia, and Norway are the principal countries furnishing this softwood lumber, the main source of supply for the building, millwork, box, and packing-case industries, also for the construction of permanent way and building of railroad freight cars in the United Kingdom.

Imports of north European softwoods in 1925 are shown in the following table:

Countries	Rough		Dressed		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Loads [1]		*Loads* [1]		*Loads* [1]	
Finland	1,408,185	£6,141,049	17,667	£99,125	1,425,852	£6,240,174
Sweden	925,668	4,379,626	341,575	2,040,404	1,267,243	6,420,030
Russia	952,713	4,553,237	280	1,673	952,993	4,554,910
Norway	117,580	621,126	176,646	1,061,484	294,226	1,682,610
Total	3,404,146	15,695,038	536,168	3,202,686	3,940,314	18,897,724

[1] Load equals 600 feet board measure.

In addition to lumber, these countries also furnish large quantities of softwood pit props (used in the coal-mining industry), railroad ties and poles, also a small quantity of what is known as "roundwood."

Specifications.—All lumber is imported cut to English measure and is divided into deals, battens, scantlings, boards, and ends, the sizes of which are as follows:

Deals.—2, 2½, 3, and 4 by 9 and 11 inches, very few 10 or 12 inches and wider ever being furnished.

Battens.—2, 2½, 3, and 4 by 6, 7, and 8 inches.

Scantlings.—2, 2½, and 3 by 3, 3½, 4, 4½, 5, and 5½ inches.

Boards.—½, ⅝, ¾, 1, 1¼, 1½ and 1¾ by 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 8, and 9 inches.

Ends.—All sizes, 6 to 8 feet long.

Short lengths.—All charters stipulate that ends, not exceeding 2 per cent of the total shipment, must be furnished for stowage purposes and are carried at two-thirds of the rate for stock 9 feet and longer.

In addition to these regular ends there is imported a considerable quantity of short lumber, 1 to 5½ feet in multiples of 6 inches, called "firewood" in the trade, but used chiefly by the box-making industry. Box shooks, slating and tile battens, and laths are also imported in large quantities.

Long lengths.—The usual length for deals and battens is 9 feet and up in multiples of 1 foot, averaging 14 to 15 feet on shipments from Finland, Sweden, and Norway, although longer in certain districts. For the stock from Russia, lengths are 12 feet and longer, averaging 18 to 19 feet. A great variety of sizes are used in this market, which enables the manufacturers to utilize logs to the fullest extent.

Qualities.—The majority of the north European softwood lumber, with the exception of Russian, which will be covered in the section for that country, is imported in the following grades:

Unsorted.—A combination of first, second, third, and fourth quality, as they fall from the pile.

Fifths.—The better quality of "cull" lumber.

Wracks.—Sometimes called inferior fifths.

Double wrack.—Seventh quality.

"Unsorted" quality is used principally for building construction, millwork, interior finish and trim (in British usage, "joinery"), and general utility work, "fifths" for buildings of the cheaper class, "wrack" for rough box making, "double wrack" for poling boards.

Pine and spruce are sold separately in the "unsorted" and "fifths" qualities and combined, as a rule, in the "wrack" and "double wrack." Sometimes the name "fir" is used in the British lumber trade, more particularly in the stave trade, but wherever it may be it does not refer to a particular species, but to a combination of spruce and pine.

Marking.—All north European softwood lumber is grade marked on the ends of each piece with the shippers' registered trade-mark, the usual system being to take a different combination of certain letters and signs or both for each grade. Sometimes a different colored ink is used for pine and spruce. Many of these brands are household names in the British lumber trade, and not only is preference shown for them but a higher price is paid than for others not so well known or not having so good a reputation for careful grading and good manufacture.

Prices.—The price is based, as a rule, on 2½ by 7 inches for ordinary specifications of "unsorted" north European softwood lumber, with certain additions for wider widths and deductions for narrower. These amounts, however, are not fixed but vary according to the specification required and supply available. Should there be a shortage of any particular item, shippers not only raise the price but make the supply of it contingent on the importer taking a certain quantity of less desirable sizes. More and more since the war north European lumber manufacturers are getting away from the idea of sawing logs to get the most lumber out of them regardless of the demand and are cutting to meet the requirements of their customers so that the old idea of a "base price list" does not apply to the same extent as formerly. This does not work any hardship on the British importer, but is to his advantage, as the buying of large quantities of unsalable stock is avoided and purchases are confined, to a great extent, to dimensions for which there is a demand.

The base price list for "unsorted" quality north European softwood follows:

Thickness 2, 2½, and 3 inches, width 11 inches, base price plus £2 10s. per standard of 1,980 feet board measure.

Thickness 2, 2½, and 3 inches, width 9 inches, base price plus £1 10s. per standard.

Thickness 2, 2½, and 3 inches, width 8 inches, base price plus 10s. per standard.

Thickness 2, 2½, and 3 inches, width 7 inches, base price.

Thickness 2, 2½, and 3 inches, width 6 inches, base price less 10s. per standard.

Thickness 2, 2½, and 3 inches, width 5 and 6 inches, base price less £1 per standard.

Thickness 3 inches, width 4 and 4½ inches, base price less 5s. per standard.

Thickness 2 inches, width 4½ inches, base price less £1 10s. per standard.

Thickness 2 inches, width 3 and 4 inches, base price less 5s. per standard.

Boards (all thicknesses) 9 inches wide, plus £1 over deals and battens.

Boards (all thicknesses) 6, 6½, 7, and 8 inches wide, plus 10s. over deals and battens.

Boards (all thicknesses) 5 and 5½ inches wide, plus 5s. over deals and battens.

Boards (all thicknesses) 3, 3½, 4, and 4½ inches wide, 5s. less than 5 by 5 inch boards.

Fifth quality, all sizes, £2 to £2 10s. less than "unsorted" in same dimensions in deals and battens.

Wrack, all sizes, sold at an overhead price according to market.

Double wrack (seventh quality), all sizes, sold at an overhead price according to market.

Ends, all sizes, two-thirds the price of stock 9 feet and longer.

Grading and manufacture.—There are no written grading rules for north European softwood such as are used in the United States, but long experience has established a thorough understanding between the exporters and the British import trade as to the kind of stock which may be shipped against the several qualities specified in the contract. There is no universal standard for any country, but grades vary according to the district from which shipment is to be made, and orders are placed on this basis.

As there is little difference apparent between the heart and sap wood for practical purposes in either pine or spruce, sap is not considered a defect in any grade, but pine shipped from districts where the timber runs heavily to sapwood is of less value than where it is largely heart.

Edge grain or rift sawn lumber is unknown, as the method of manufacturing by gang saws precludes the possibility of making it except by chance.

The manufacture is excellent in every respect, the lumber being cut to great exactitude; and it is generally used as a standard with which to compare imports from other countries, generally to their detriment.

North European lumber is shipped surface dry, about 45 days in the summer and from two to three months in the winter being considered sufficient for seasoning. Great care is taken to see that it is in bright condition, but in spite of every care a bad spell of weather will cause it to discolor resulting in heavy claims being made. Finnish shippers have been endeavoring for some time to have contracts include a certain percentage of "blue" stock, but such a stipulation lowers the prices obtainable and buyers do not like it. On the other hand, Swedish shippers always sort out the discolored stock and sell it separately, the usual value being about the same as "fifth" quality.

Shipping season.—Most of the ports in northern Europe from which lumber is exported are icebound from November to late April, although the period varies with their location and the early or late arrival of winter or spring and the success of ice breakers, which are employed in some instances to keep them open. As a consequence of these conditions, the bulk of the enormous volume of lumber exported from northern Europe must be shipped in about seven months. The opening of the shipping season generally witnesses a rush of vessels to load in order that their cargoes may be among the earliest arrivals on a depleted market.

Toward the end of the season there is the same rush of vessels to load, as there is constant danger at that time of the ports being frozen before all shipments have been made, also on account of restriction of deck loads to 3 feet for vessels arriving at a United Kingdom port after October 31, thus necessitating the "overwintering" of stocks until first open water the following spring. Unfortunately this condition affects not only lumber already sold but unsold balances, and the end of the shipping season usually witnesses strenuous efforts on the part of the smaller shippers to dispose of these, either by quoting very low prices or by shipping them on consignment to be sold at the best available offer on arrival, either of which methods has a very disturbing effect on the British market.

There are some exceptions, however, as some ports are not affected by ice and are open all the year round, notably those in Norway, all of the west and east coasts of Sweden, south of and including Stockholm, and one or two ports in the south of Finland. The lumber shipped from some of the districts in south Sweden is short, sappy, and coarse-grained, and for that reason it is principally sold when other stock can not be obtained.

FINLAND

Prior to the Great War, imports of lumber from Finland were included with those from Russia, but since 1921 separate figures have been compiled in British customs statistics.

During that year imports of Finnish softwood lumber into the United Kingdom amounted to 725,152 loads of 600 feet board measure but since that time they have grown larger each year so that by the end of 1925 that country had gained the premier position among all those supplying the softwood lumber needs of the United Kingdom, with a total of 1,425,852 loads, an increase of over 96 per cent. During the same period, the value increased from £3,335,501 to £6,240,174. The United Kingdom is easily the most important outlet for Finnish lumber and about 43 per cent of the total exports are to this market.

The following table shows the imports of softwood lumber into the United Kingdom from Finland for the years indicated:

Year	Rough		Dressed		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Loads [1]		*Loads* [1]		*Loads* [1]	
1921	717, 049	£3, 281, 210	8, 103	£54, 291	725, 152	£3, 335, 501
1922	1, 026, 664	4, 689, 354	13, 678	76, 702	1, 040, 342	4, 766, 056
1923	1, 165, 785	6, 325, 473	12, 138	76, 636	1, 177, 923	6, 402, 109
1924	1, 314, 908	6, 411, 788	13, 844	88, 044	1, 328, 752	6, 499, 832
1925	1, 408, 185	6, 141, 049	17, 667	99, 125	1, 425, 852	6, 240, 174

[1] Load equals 600 feet board measure.

Of all the districts shipping lumber to the United Kingdom, Kemi and Bjorneborg for pine, and Viborg and Bjorneborg for spruce, are preferred and, as a rule, stocks from these places bring higher prices than those shipped from other districts.

Finnish pine (called "redwood" or "yellow" in the United Kingdom according to locality) and spruce ("whitewood") are the main sources of supply for the ordinary building and general utility trades in Great Britain and are used indiscriminately according to market values. The pine, generally speaking, is not suitable for remanufacturing on account of its excessive sap and large number of knots, pine from certain districts of Sweden, and more particularly Russia, being preferred for these purposes. However, there are a few exceptions, the most notable being that of the lumber cut in the Province of Karelia, which lies partly in Finland and partly in Russia. Wood from this district was formerly shipped from Russian ports but, with the separation of Finland from that country, the sawmill industry has been considerably developed. The texture of the wood is of a superior quality and is gaining an excellent reputation in the United Kingdom market for millwork.

Planing mill industry.—The planing mill industry is being slowly developed in Finland, the principal efforts of the lumber industry in the past having been in the manufacture of rough lumber.

Principal demand.—The principal demand for Finnish softwoods is in "unsorted" quality, particularly 2 by 4 inch and other small sizes used in the house-building industry. During the war and post-war boom, the principal demand was for deals, used mostly in the heavy industries, so that their manufacture was greatly stimulated in the producing countries. With the collapse of that boom, however, the demand was transferred to the house-building industry which, under Government and municipal subsidy, was just beginning to show activity after having lain dormant since the commencement of the war. As a result of the building stoppage during the war, there had accumulated an immense shortage of dwellings and there then began one of the largest building booms ever known in the United Kingdom. From one end of the country to the other tens of thousands of houses were being built under municipal housing schemes so that the demand for lumber was transferred to the smaller dimensions and has remained so up to this time. The early months of 1927, however, witnessed a revival of the heavy industries so that what had been more or less a drug on the market for several years came into demand again and a shortage in deals developed.

Prices.—Generally speaking, the prices obtained for Finnish lumber are somewhat below the Swedish in the United Kingdom, varying from 10s. to 30s. per standard for pine and 5s. to 10s. for spruce, depending on the districts from which the stocks are shipped and reputation of the manufacturer. Some of the best shippers, however, get about the same prices for their lumber as are obtained for similar grades of first-class stock from the north of Sweden.

The following were the approximate prices of "unsorted" quality pine at the opening of the 1927 buying season for "first open water" shipment:

Thickness 2, 2½, and 3 inches, width 11 inches, £16 per standard of 1,980 feet board measure.
Thickness 2½ inches, width 9 inches, £15 per standard.
Thickness 2½ inches, width 8 inches, £14 per standard.
Thickness 2½ inches, width 7 inches, £13 10s. per standard.
Thickness 2½ inches, width 6 inches, £13 per standard.
Thickness 2½ inches, width 5 and 5½ inches, £12 10s. per standard.
Thickness 3 inches, width 4 and 4½ inches, £12 15s. per standard.
Thickness 2 inches, width 4½ inches, £12 per standard.
Thickness 2 inches, width 3 and 4 inches, £12 15s. per standard.
Boards (all thicknesses), width 9 inches, £1 over deals and battens.
Boards (all thicknesses), width 6, 6½, 7, and 8 inches, 10s. over deals and battens.
Boards (all thicknesses), width 5 and 5½ inches, 5s. over deals and battens.
Boards (all thicknesses), width 3, 3½, 4, and 4½ inches, £12 10s. over all.
Fifth quality, all sizes, from 40s. to 50s. less than "unsorted," the boards being included at same prices as deals and battens.
Wrack or inferior fifths, all sizes, £8 5s. over all.
Ends (6, 7, and 8 feet), two-thirds the price of 9-foot and longer stock.
Spruce brought from 5s. to 10s. per standard less than the above prices.
All prices are f. o. b. loading ports, the chartering being done by the buyers.

Occasionally, during the season, sales are made on a c. i. f. basis on account of shippers having had an opportunity to charter a vessel at a favorable rate but, generally speaking, it is customary for purchases to be made f. o. b. However, prices vary according to the district from which shipment is made (some producing better timber than others) and the name of the manufacturer. Naturally those brands which have gained a good reputation for grading and manufacture in this market bring a better price than lesser known ones or those whose stock is not considered of the first class.

Ocean freight rate.—The ocean freight rate for full cargoes from Finland to London or good east coast United Kingdom port was about 45s. per standard for 1927 "first open water" loading on Baltwood form of charter, for particulars of which see "Methods of import trade."

SWEDEN

After the disintegration of the Russian Empire, Sweden became the principal source of supply for softwood lumber used by the building industry and for the manufacture of millwork in the United Kingdom. In 1924, however, it was supplanted by Finland, which country has retained first position ever since.

The lumber is imported both rough and dressed, the total in 1925 amounting to 1,267,243 loads of 600 feet board measure valued at £6,420,030, of which 341,575 loads, valued at £2,040,404, were dressed, and for grading and manufacture it bears the highest reputation in this market.

The manufacture of dressed stock is highly developed in Sweden and during 1925 approximately 63 per cent of the total British imports of north European softwood flooring, matching, etc., came from that country, full particulars being given in section on "Planing-mill products."

Imports of softwood lumber into the United Kingdom from Sweden for the years indicated are shown in the following table:

Year	Rough		Dressed		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Loads [1]		*Loads* [1]		*Loads* [1]	
1921	643, 407	£4, 398, 280	142, 822	£1, 222, 443	786, 229	£5, 620, 723
1922	1, 148, 268	5, 659, 118	213, 066	1, 388, 389	1, 361, 334	7, 047, 507
1923	1, 014, 388	5, 427, 625	265, 044	1, 905, 352	1, 279, 432	7, 332, 977
1924	872, 831	4, 577, 430	333, 219	2, 260, 446	1, 206, 050	6, 837, 876
1925	925, 668	4, 379, 626	341, 575	2, 040, 404	1, 267, 243	6, 420, 030

[1] Load equals 600 feet board measure.

The United Kingdom is also the most important market for Swedish softwood lumber and during 1925 approximately 40 per cent of the total exports from Sweden were shipped to the United Kingdom.

Factory lumber.—Both pine and spruce are imported and next to Russian the Swedish pine is more largely used for millwork than any other. Not all of it, however, is suitable for this purpose, a clear distinction being made in the trade between "joinery" and building wood, the former naturally having the higher value.

The Gefle, Soderhamn, Hudiksvall, and Sundsvall districts furnish the best factory lumber on account of the thin sap, freedom from knots, and mild texture. While the district from which spruce originates is not so important as pine, it being largely used in its original form or else resawn into smaller dimensions and seldom for remanufacturing, some stocks are liked better than others, those from Hernosand and Sundsvall being preferred.

Specifications and price differentials.—Swedish softwood lumber is imported in similar specifications to the Finnish, it is graded in the same manner, and, except for the factory lumber, is used for the same purposes.

Small cargoes of from 350 to 450 standards are preferred by the British importers, and the following specification shipped from the Gefle district shows the variety of sizes contained in one shipment which may be taken as a fair average, although the quantity of special items will vary according to the needs of the buyer.

"JOINERY" QUALITY

	Inches		Inches
20 standards	3 x 11	40 standards	2 x 4
15 standards	3 x 9	5 standards	1½ x 9
10 standards	3 x 8	10 standards	1½ x 5
20 standards	3 x 7	10 standards	1¼ x 6
20 standards	3 x 6	5 standards	1 x 9
15 standards	3 x 5½	10 standards	1 x 5
10 standards	3 x 4	15 standards	1 x 4
5 standards	2 x 9	5 standards	⅝ x 5
10 standards	2 x 7	5 standards	⅝ x 4
10 standards	2 x 6	5 standards	⅝ x 3½
10 standards	2 x 5	5 standards	⅝ x 3

BUILDING QUALITY

	Inches		Inches
15 standards	3 x 11	16 standards	3 x 5½
15 standards	3 x 9	25 standards	2 x 4
13 standards	3 x 8	14 standards	1¼ x 7
22 standards	3 x 7	6 standards	1⅞ x 5½
15 standards	3 x 6	10 standards	1⅞ x 5

SLIGHTLY DISCOLORED

	Inches
16 standards	2 x 4

A total of 413 standards, or about 820,000 feet board measure.

The various qualities and discolored stock are always branded with a different mark.

About the same price differentials for the various qualities and sizes apply to both Swedish and Finnish stock with the difference that Swedish pine sells for from 10s. to 30s. per standard and the spruce 5s. to 10s. more than that from Finland. In addition to the regular grades, there is one known as "double wrack," used principally for manufacturing into pole boards. At the opening, this stock, which is shipped in all sizes, in other words, the worst of the culls after all higher grades had been sorted out, was quoted at about £5 per standard f. o. b. loading port.

Ocean freight rates.—Ocean transportation charges are very slightly higher from most Swedish loading ports to the United Kingdom than Finland.

RUSSIA

Since 1921 British statistics include lumber imported from former Russian territory under Finland, Estonia, Latvia, Lithuania, and Poland, so that imports from Russia show a considerable reduction over pre-war years.

Owing to the war and the revolution that followed, also the loss of great areas of producing territory, production of softwood lumber in Russia for export was reduced to very small proportion so that in 1921 the United Kingdom, the most important foreign market for it, only imported the small quantity of 114,815 loads, valued at £755,785. However, since that time, great efforts have been made by the Soviet Government, under whose control the sawmilling industry lies, to increase the production with such satisfactory results that, by 1925, British imports had increased to 952,993 loads, valued at £4,554,910.

Practically all the lumber is rough sawn, the amount of dressed stock being negligible.

Imports of softwood lumber into the United Kingdom from Russia, for the years indicated, are shown in the following table:

Year	Rough		Dressed		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Loads [1]		*Loads* [1]		*Loads* [1]	
1921	114, 815	£755, 785			114, 815	£755, 785
1922	392, 462	2, 333, 032	585	£4, 921	393, 067	2, 337, 953
1923	600, 618	3, 464, 502	1, 741	9, 717	602, 359	3, 474, 219
1924	938, 795	4, 886, 924	92	564	938, 887	4, 887, 488
1925	952, 713	4, 553, 237	280	1, 673	952, 993	4, 554, 910

[1] Load equals 600 feet board measure.

Imports for 1926 showed a considerable falling off as compared with 1925 and, according to preliminary figures, the quantity of rough sawn lumber amounted to 722,929 loads, valued at £3,224,190.

Principal shipping districts.—Practically all the Russian softwood lumber imported by the United Kingdom is from the White Sea and Leningrad districts. The principal loading ports in the first named in order of their importance are Archangel, Onega, Soroka, Kem, Kovda, Keret, and Mesane. Of these, Archangel is by far the most important. All shipments from the Leningrad district are loaded at the port of that name.

Pine (called "redwood" or "yellow," according to the locality in which it is sold) and spruce ("whitewood") are both imported from these districts, it being estimated that of the total imports of Russian softwood lumber by this market approximately 60 per cent is pine and 40 per cent spruce.

The White Sea stock is preferred to the Leningrad and its distribution is spread over the entire United Kingdom. On the other hand, Leningrad stock goes chiefly to the Humber district on the east coast of England and Scotland, very little elsewhere.

Shipping season.—Vessels for the White Sea having to pass around the North Cape through the Arctic Ocean are compelled to wait until the summer is well advanced for safe navigation, so that it is usually some time in June before the first of the season's loadings take place and the end of November or occasionally early December sees its close. On the other hand, Leningrad, being farther south and reached through the Gulf of Finland, has a longer shipping season, extending approximately from May to the end of December.

Qualities and sizes.—Russian softwood lumber imported into the United Kingdom differs somewhat in grading from that coming from other north European countries as will be noted from the tabulation giver later. Pine from the White Sea 7 inches and wider is nearly always sold sorted in the different qualities and only in the 6 inches and under is it normally sold "unsorted." Spruce from the White Sea, however, with the exception of the 3 by 9, 10, and 11 inch deals, which are sorted into first, second, and third qualities, is sold "unsorted."

The lengths are exceptionally long compared with the lumber shipped from other north European countries and will average 18 to 19 feet, except in the first and second qualities, which will run a little less.

On account of the special market that has been developed in the United Kingdom for White Sea ends, lumber from that district is shipped 12 feet and longer, while that from the Leningrad district is 9 feet and longer.

All lumber for the United Kingdom is cut to English measure, that 5 feet and longer in odd and even feet, while the 1½ to 4½ feet is cut in multiples of 6 inches.

The sizes and qualities of White Sea softwoods (pine, redwood or yellow) are as follows: 2, 2½, 3, and 4 by 11 inches, first, second, third, unsorted (first, second, third, and fourth), and fourth quality; 2, 2½, 3, and 4 by 9 and 10 inches, first, second, third, unsorted, and fourth quality; 4 by 7 and 8 inches, first, second, third, unsorted, and fourth quality; 2, 2½, and 3 by 8 inches, first, second, third, unsorted, and fourth quality; 2, 2½, and 3 by 7 inches, first, second, third, unsorted, and fourth quality; 4 by 6 inches, unsorted quality; 3 by 4, 5, 5½, and 6 inches, unsorted quality; 2 and 2½ by 6 inches, unsorted quality; 2 and 3 by 4 inches, unsorted quality. Very little unsorted quality is now shipped in the 2 to 4 by 7 inches and wider and never the best stocks, which are always graded.

The sizes and qualities of boards are as follows: ½, ⅝, ¾, ⅞, 1, 1¼, 1½, and 1¾ by 7, 8, 9, and 11 inches, first, second, third, unsorted (first, second, third, and fourth), and fourth quality; ½, ⅝, ¾, ⅞, 1, 1¼, 1½, and 1¾ by 4, 4½, 5, 5½, and 6 inches, first, second, third, unsorted (first, second, and third), and fourth quality.

It will be noted that "unsorted" quality in boards 6 inches wide and under consisted of first, second, and third qualities only, the fourth quality being sold separately. But while this applies invariably to the Archangel and Onega stocks, shipments from the other White Sea ports sometimes include the fourth quality in their "Unsorted." In addition to the above qualities, there is a fifth quality taking all sizes, which is sold at an over-all price.

The sizes and qualities of spruce (whitewood) are as follows: 3 by 10 and 11 inches, first, second, third, and unsorted (first, second, third, and fourth) quality; 3 by 9 inches, first, second, third, and unsorted quality; 1 to 2½ by 9 and 11 inches, unsorted quality; 1 inch and up by 8 inches, unsorted quality; 1 inch and up by 7 inches, unsorted quality; 1 inch and up by 6 inches, unsorted quality; 1 inch and up by 4 to 5½ inches, unsorted quality; ½, ⅝, ¾, and ⅞ by 9 and 11 inches, unsorted quality; ½, ⅝, ¾, and ⅞ by 4 to 11 inches, unsorted quality.

Attention is called to the fact that only the 3 by 9, 10, and 11 inches are sorted into first, second, and third qualities in most stocks, other sizes being sold in "unsorted" only. There is also a fourth quality, taking all sizes, which is sold at an over-all price. Unlike pine, there is no fifth-quality spruce imported into the United Kingdom.

Leningrad stocks.—These are almost exclusively sold in "unsorted" qualities, both in pine and spruce.

Ends (*short lengths*).—Ends from the White Sea are divided into two groups, namely, 5 to 11 feet cut in odd and even feet and 1½ to 4½ feet cut in multiples of 6 inches. Both are shipped in "unsorted" quality only, but while the 5 to 11 feet are mixed pine and spruce, the species are sold separately in the 1½ to 4½ foot lengths for the reason that their principal use is for box-making purposes; boxes to contain foodstuffs necessarily must be made from spruce on account of an odorless wood being required. For sales purposes they are sorted as follows, each item carrying a separate price:

Unsorted 5 to 11 foot pine and spruce ends: 3 and 4 by 9, 10, and 11 inches, 3 and 4 by 8 inches, 3 and 4 by 7 inches, 3 and 4 by 6 inches, 3 and 4 by 4 to 5½ inches, 2 and 2½ by all widths; all boards. Unsorted 1½ to 4½ feet: Pine—2, 2½, 3, and 4 by all widths, boards 1 inch and thicker, boards ¾ inch and under; spruce—all sizes.

The foregoing specifications of ends apply to White Sea stock only and not to Leningrad, which is shipped in 6 to 8 feet only.

Strips.—Large quantities of pine and spruce strips in a variety of sizes are imported, the White Sea district furnishing practically all. The species are shipped separated in first, second, and "unsorted" qualities, the lengths being divided into three groups, 12 feet and up, 5 to 11 feet, and 1½ to 4½ feet, in the following widths and thicknesses:

3 by 3, 2½, 2, 1¾, 1½, 1¼, 1, ⅞, ¾, ⅝, and ½ inch.
2½ by 2½, 2, 1¾, 1½, 1¼, 1, ⅞, ¾, ⅝, and ½ inch.
2 by 2, 1¾, 1½, 1¼, 1, ⅞, ¾, ⅝, and ½ inch.
1½ by 1½, 1, ⅞, ¾, ⅝, and ½ inch.
1 by 1, ½ inch.

The 12-foot and up lengths only are occasionally sorted into first and second qualities, most shipments being in "unsorted" quality.

Marking.—All Russian lumber is grade marked on the end with a hammer brand, the usual method being to use certain letters to indicate the shipper in conjunction with numerals for the sorted qualities and a symbol to indicate the unsorted quality, usually U/S. Some lumber also bears the soviet badge of hammer and sickle.

Principal uses—pine or redwood.—Russian pine has for many years been a prime favorite in the United Kingdom for millwork, interior finish and trim, no other northern European lumber being considered equal to it for that purpose.

First and second quality White Sea pine is the favorite softwood used for millwork in the United Kingdom. Their cost, however, which in the deal and board sizes 9 to 11 inches was about £40 per standard c. i. f. for first quality and £30 for second for May/June, 1927, delivery, precludes their use except for the very highest class of work, such as interior finish of houses and such softwood finish as is used in railroad carriages and steamships. First quality, however, is only available in very small quantities, the bulk used being second.

The third and unsorted qualities are likewise used for millwork but of the cheaper variety and for the framework of superior types of houses.

Fourth quality, which is only obtainable 2 inches and thicker by 7 inches and wider, is a favorite for the heavier framework of buildings on account of the long lengths usually included in this grade. It is perfectly sawn and free from heavy wane, the principal defects being shakes, hardrot, and black knots. Such sizes as 2 by 3 inches and 2 by 4 inches largely used in the house-building industry are not obtainable in fourth quality, as they are not sorted to this grade.

Fifth quality is lumber having bad shakes and knots and is used principally for cutting up purposes, such as boxes, where an odorless wood is not required.

Spruce or whitewood.—First quality is used largely for ladder making and such millwork as permits spruce (table tops, etc.).

Second quality for millwork of the cheaper kinds and high-class packing cases and boxes.

Third and unsorted qualities are used mostly for packing cases and boxes, while fourth quality is one of the favorite packing case and box woods used in this market for good class cases.

Since eastern Canadian spruce in box-making quality has been so largely diverted to the pulp industry, White Sea spruce has largely taken its place for this purpose in the United Kingdom.

Ends.—Pine and spruce are used principally for the manufacture of boxes of the better class, millwork such as table legs, and for flooring blocks, the latter being of pine only.

Strips.—Most of the better class molding manufactured in this country is made from "unsorted" quality White Sea pine or spruce strips. All sizes are used in lengths of 12 feet and longer.

The short lengths of pine in "unsorted " qualities and "unsorted" spruce in all lengths are principally used for crating, a very large quantity being used for crating bicycles and baby carriages.

Prices.—All sales of Russian softwoods are made on a c. i. f. basis and while no "base" list, similar to that of the Norwegian flooring exporters, is in use there are certain items of a basic character from which, generally speaking, all others are fixed, either by addition or deduction. This base line is usually 7-inch as in Finnish or Swedish stocks but 9-inch is also used as a basis.

The following are the principal items, together with approximate prices at the opening of the 1927 selling season for delivery during May/June of that year. Stock sheets and price lists are usually in the hands of British agents several months before the shipping season opens, and it is estimated that by early May, 1927, about 450,000,000 to 500,000,000 feet board measure of Russian softwoods had been sold for the new season's delivery.

The following are prices for White Sea softwoods at the opening of 1927 selling season:

Pine

2, 2½, 3, and 4 by 9 and 10 inches:
    "Unsorted" and third quality, £19 per standard.
    Fourth quality, £15 10s. per standard.
2, 2½, and 3 by 8 inches:
    "Unsorted" and third quality, £17 5s. per standard.
    Fourth quality, £15 per standard.
2, 2½, and 3 by 7 inches:
    First quality, £23 per standard.
    Second quality, £20 per standard.
    "Unsorted" and third quality, £16 15s. per standard.
    Fourth quality, £15 per standard.
2 to 4 by 4 to 6 inches, "unsorted" (according to size), £15 15s. to £16 15s. per standard.
4 by 7 and 8 inches, first, second, third, and "unsorted" quality, 10s. extra.

Boards.—The prices for boards vary according to the width, but all thicknesses 1 inch and over take the same price.

11-inch, first quality, £44; second quality, £34; third quality, £24; unsorted, £25 10s.; fourth quality, £14 10s.
9-inch, first quality, £41 10s.; second quality, £31 10s.; third quality, £21; unsorted, £22 10s.; fourth quality, £14 10s.
7-inch, first quality, £26; second quality, £22; third quality, £17 10s.; unsorted, £18 10s.; fourth quality, £14 10s.

4, 4½, 5, 5½, and 6 inch sold in "unsorted" and fourth quality only £17 to £18 for former and £13 10s. to £14 10s. for latter according to width.

⅞ and ¾ inch boards, first, second, third, and unsorted, 10s. extra.

⅝-inch boards, first, second, third, and unsorted, 15s. extra.

½-inch boards, first, second, third, and unsorted, 20s. extra.

Only the actual contents of thin lumber is charged for.

Fifth quality.—All dimensions of fifth quality lumber are sold at an over-all price, which was £12 per standard.

Spruce

2, 2½, and 3 by 11 inches:
- Second and "unsorted" quality, £19 per standard.
- Third quality, £15 15s. per standard.

3 by 9 inches:
- First quality, £22 per standard.
- Second and "unsorted" quality, £17 10s. per standard.
- Third quality, £15 15s. per standard.

1 inch and thicker by 7 inches, "unsorted" quality, £16 per standard.

1 inch and thicker by 4 to 6 inches, "unsorted" quality, £15 5s. to £15 15s. per standard.

⅞ and ¾ inch, all sizes and qualities, 10s. extra.

⅝-inch, all sizes and qualities, 15s. extra.

½-inch, all sizes and qualities, 20s. extra.

Fourth quality.—All dimensions of fourth quality are sold at an over-all price, which was £13 10s. per standard.

Ends.—The price of "unsorted" 5 to 11 feet mixed pine and spruce ends in the 3 and 4 inch thick ranged from £13 10s. to £15 10s. according to the width, 2½ and 2 inch took 10s. and all boards 20s. less. "Unsorted" 1½ to 4½ foot pine 3 and 4 inch, all widths £11 10s., 2 and 2½ inch, £10 10s., boards 1 inch and thicker, £10, under 1 inch, £9. Spruce in "unsorted" quality, all sizes, £11 over all.

Strips.—
- 12 feet and up, unsorted pine, £17 10s.; unsorted spruce, £16.
- 5 to 11 feet, unsorted pine, £13; unsorted spruce, £13 10s.
- 1½ to 4½ feet, unsorted pine and spruce, £19.

The above prices include cost of bundling.

All prices given in the preceding paragraphs are for White Sea stock, c. i. f. east coast coal port or London, Surrey Commercial Dock, for delivery during the 1927 shipping season, Merblanc form of charter, and free of all discharging expenses to shippers, usual extras for outports. The basic prices are for cargoes of 850 standards and up.
- For 750 standards to under 850 standards, 1s. 6d. per standard extra.
- For 625 standards to under 750 standards, 2s. 6d. per standard extra.
- For 500 standards to under 625 standards, 5s. per standard extra.

Under 500 standards, subject to opening basis freight of 850 standards steamer and up, any additional freight for buyer's account.

Prices for Leningrad stock vary little from the White Sea, but, as stated previously, this has only a limited sale in the United Kingdom. Most sales from this district are c. i. f. on a Baltwood form of charter.

Sales agencies.—The Russian lumber industry is operated by a number of commercial organizations in various producing sections of that country. All the export sales of these are handled through a central trust known as "Exportless," which employs the services of various British wood agents to act as their sales representatives in the United Kingdom.

Larch.—Before the war small quantities of Russian larch were imported into the United Kingdom, principally in the form of hewn logs and used for masts of yachts and small sailing vessels. Practically none of this business has been done, however, since the war, although occasionally a few standards of larch may be included in a cargo of pine and spruce.

Lumber from the Kara Sea district.—For several years past there have been received in Great Britain parcels of lumber described as being from the Kara Sea, although they actually originated in the interior of Siberia many hundreds of miles up the Yenisei, River which empties into the Kara Sea. These parcels consist principally of pine of exceptionally high quality and to a smaller extent, kedar, said to be equal to the best Canadian white pine. There is, however, only one sawmill as yet in operation in this district so that the production of lumber is very small. The lumber is transported on barges to the mouth of the Yenisei River, where it is transferred to ocean-going vessels. However, there is only about two months open navigation in the Kara Sea so that the voyage is more in the nature of an expedition than ordinary business. As a rule, the vessels take out agricultural implements and chemicals, for sale in Siberia, loading as return cargo lumber, furs, flax, and minerals. Some of the lumber has even been shipped by rail to Leningrad or to Vladivostok, but the cost is too heavy for this method to be generally adopted. The expansion of the lumber industry in this district, therefore, rests to a great extent on additional transportation facilities and until these are developed little increase is possible.

Russian pine and Douglas fir.—The supply of second quality White Sea pine, particularly in the 3 by 9 to 11 inch sizes, has a direct influence on the demand for No. 2 clear and better Douglas fir in the United Kingdom.

Although Douglas fir is usually the cheaper wood, British millwork manufacturers will always pay a higher price for the Russian product but should there not be sufficient available to meet all demands Douglas fir is their second choice for the better class work.

The chief complaint made against Douglas fir as a factory wood is that its raised grain makes it impossible to obtain a perfectly flat paint finish. As most of the finish in the United Kingdom is painted, this is a serious matter, and while the Russian pine contains many more knots they are small and tight and do not show when painted, so are not considered a serious defect. On the other hand, the freedom from knots of Douglas fir does not offset the matter of raised grain.

It must therefore be admitted that as long as sufficient supplies of Russian pine can be obtained there will be no considerable increase in the consumption of Douglas fir for millwork in this market. Should, however, the quantity available be materially reduced by any circumstances, Douglas fir would reap the benefit.

NORWAY

The rough sawn softwood lumber imported from Norway is of pine or spruce similar to the stock shipped from Sweden and Finland but of smaller dimensions, most of it being in scantling sizes. Norwegian lumber, as a rule, is sold 60 per cent "wany," but where mixed cargoes of dressed stock, flooring, and scantling are sold to a British outport, the deck load is usually scantlings and these are square edged. In addition to the scantlings some rough box shooks are also imported.

Norwegian "wany" scantlings are not cared for in the British market, their low price, as a rule, being the most important factor in their favor. They are principally used for rough framework in dwelling houses or are cut up for boxes and packing cases.

EASTERN EUROPEAN SOFTWOODS

Latvia, Poland, Estonia, and Lithuania are the principal countries in eastern Europe, or the Baltic region, shipping softwoods to the United Kingdom. They have the advantage of having their ports open practically all the year round so that, except for special items, their best business is done during the winter months when stock from the more northern ports is not available.

Pine (redwood) and spruce (whitewood) in similar specifications (the largest sizes being 3 by 9 and 11 inches with a few 4 inches) to those from the north European countries are the main species imported, but their quality, on the whole, is not as good. Of these countries, Latvia and Poland are the most important, followed by Estonia and Lithuania, the quantity imported from the last named being of insufficient importance to justify its segregation in British trade statistics, but is included in the total for "All other countries."

Practically all of the lumber is imported rough sawn with the exception of a very small amount of dressed stock from Latvia. The Government of that country, in order to encourage its manufacture, has set a lower export duty upon dressed stock and box shooks than applies to rough-sawn lumber. With the exception, however, of box shooks, this action has produced little result as far as the British imports are concerned.

The following table shows imports of softwood into the United Kingdom from eastern European countries in 1925:

Countries	Rough		Dressed		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Loads [1]		*Loads* [1]		*Loads* [1]	
Latvia	368, 146	£1, 676, 532	7, 659	£47, 078	375, 805	£1, 723, 610
Poland (including Danzig)	246, 756	1, 057, 789			246, 756	1, 057, 789
Estonia	136, 217	580, 084			136, 217	580, 084

[1] Load equals 600 feet board measure.

Generally speaking, eastern European pine is unsuitable for remanufacturing but is comparable to the inferior Finnish and south Swedish stocks and, like them, is used for ordinary building purposes.

All lumber is grade marked on the ends and the prices obtainable in this market are considerably influenced by them.

LATVIA

Riga, Libau, and Windau are the principal lumber-loading ports of Latvia, the former predominating. The Latvian lumber industry specializes in the manufacture of what are known as "wagon bottoms" for the British railroad freight-car building trade. These wagon bottoms are 2½ by 7 inches, 7 or 7½ feet long, and may be of pine or spruce. Practically the entire requirements of this market are obtained from Latvia. It also specializes in lumber cut to size for the sides and ends of British railroad freight cars, the principal sizes being 2½ and 3 by 7, 8, and 9 inches, with a few 11 inches, all 14 to 17 feet long. Recently Latvia has been paying more attention to the manufacture of box shooks, the export duty being much less upon them than on rough lumber.

Specific short-length cutting.—Another unusual feature of the Latvian lumber industry is that ends 5 to 9 feet long are specially manufactured from logs cut to length for that purpose and are not merely accumulations from longer lengths that have been trimmed for grading purposes. Large quantities of these ends are imported into the United Kingdom for box-making purposes and for paving blocks; the latter, however, being of pine only, spruce being unsuitable.

The United Kingdom is easily the most important market for Latvian lumber, over 50 per cent of the total exports in 1925 going to that country. Sales have been greatly helped during the past few years because the lumber can be bought not only in special widths but also in particular lengths of each width, which is a great advantage to the British lumber importer.

Qualities and specifications.—Two qualities are imported by this market—"unsorted" (first, second, and best of thirds) and "third and fourths" (consisting of the worst of the thirds and all fourths). The usual north European specifications are cut of deals, battens, scantlings, and boards. The lengths, however, on the whole, run slightly shorter than shipments from those countries.

Prices.—Prices for Latvian softwood lumber are usually quoted separately on each item but, during the spring of 1927, the market for an average specification of deals and battens was approximately £14 10s. per standard for "unsorted" quality pine and £15 for spruce, c. i. f. London or good east coast United Kingdom port, with 5s. to 7s. 6d. per standard additional for good west coast port.

In third and fourth quality no difference is made between pine and spruce and they are usually sold mixed, the market being around £13 c. i. f. London or good east coast port, with the usual addition to cover the extra ocean freight rate to the west coast. Occasionally, however, a shipper will sell spruce only when he gets an increase in the price to cover sorting charges, and a bit more.

POLAND (INCLUDING FREE PORT OF DANZIG)

Practically all Polish sawmills are in the eastern interior of the country and lumber must be transported to Danzig by rail for export. This railroad service is often uncertain so that it is difficult to tell with certainty just when cars will reach port after leaving the interior mill. It is, therefore, customary for exporters to wait until their stocks are moving to the port and then sell for delivery as near as possible to the estimated date of their arrival at Danzig. These exporters are not in a position to store their lumber at Danzig for indefinite periods as heavy charges accrue and it is necessary for them to be shipped as soon as possible after arrival to avoid these charges.

Very little business is done with Poland on a f. o. b. basis as, owing to the difficulty and expense of storing at Danzig, exporters prefer to do their own chartering rather than hold stocks to suit buyers' convenience. When f. o. b. contracts are made, however, shippers frequently insist that, if shipment is delayed beyond a certain date, a fixed amount of rent per month shall be paid to cover the storage costs.

Since 1921, the first year for which statistics are available for Poland as an independent country, imports of lumber from it into the United Kingdom have made rapid progress. The reasons for this are various, an important one being the development of "mill-run" quality which entails the minimum of sorting and consequently enables exporters to accept prices with which shippers in the north European countries could not compete in the British market.

Imports of softwood lumber into the United Kingdom from Poland, for the years indicated, are shown in the following table:

Year	Quantity	Value
	Loads[1]	
1921	37, 477	£245, 120
1922	105, 033	434, 984
1923	192, 319	1, 030, 223
1924	323, 889	1, 524, 621
1925	246, 756	1, 057, 789
1926	514, 358	2, 063, 251

[1] Load equals 600 feet board measure.

Qualities and specifications.—Both pine and spruce lumber is imported from Poland in "unsorted" (first, second, and third), "mill-run," and "third and fourth" qualities, stock from the Vilna district being considered the best. It will be noted that the "unsorted" does not contain any fourths, differing in this respect from Sweden and Finland. Of these qualities "mill-run" is much favored in the United Kingdom on account of its cheapness, and the development of it has been a considerable factor in increasing the sale of Polish lumber. "Mill-run" includes the full run of the log as it falls from the saw with fifths and sixths out, so that a minimum amount of sorting and little storage space is required. There is naturally a considerable variation in the "mill-run" quality of the different manufacturers, but these are well known to the British importers and prices paid in accordance therewith. The policy of Polish lumber exporters of selling special as well as random lengths has also helped its sale in the United Kingdom. Specifications are similar to those from the north European and Baltic countries, the largest sizes cut being 3 by 9 and 11 inches, with small quantities of 4 by 9 and 11 inches, are imported although the lengths run longer on an average.

Polish pine on the whole is coarse-grained, hard, and has numerous large knots, making it unsuitable for remanufacturing, while the spruce is short grained and splits rather easily. Neither of them stores well, deteriorating rapidly in the British climate. Both are used largely for house building and in the box and case making industries, while considerable quantities of pine are used for the manufacture of paving blocks.

Prices.—The low price at which it can be bought, also the policy of selling special (for which they obtain an additional 10s. to 20s. per standard) as well as random lengths, has helped the sale of Polish softwood lumber in the British market.

Most of the Polish softwood is sold on a price basis, importers being willing to put up with irregularities such as uncertainty of delivery, on account of the low price of the lumber in question, as compared with similar stock from other countries.

Prices for Polish pine and spruce, like the Latvian, are quoted separately on each item but no difference is made between pine and spruce. For a fair specification of deals and battens in either species, the market during the spring of 1927 in "unsorted" quality was approximately £14 5s. per standard, c. i. f. London or good east coast port, with the usual additions or deductions for other sizes. Stock from the Vilna district, being better than the general average of Polish shipments, brought around 10s. per standard more. At the same time, "mill-run" quality was quoted about £13 10s., and "third and fourth" quality £12 15s., all c. i. f. London or good east coast port, with the addition of 5s. to 7s. 6d. per standard for delivery to the west coast to cover higher ocean freight rate. "Third and fourth" qualities are sometimes sold "mixed," but more often in spruce only or pine only.

ESTONIA

Spruce and pine lumber from Estonia is considered of better texture and manufacture than stock from the more southerly Baltic countries. It is imported in the same grades and specifications as the Latvian and used for similar purposes. The principal loading ports are Reval and Pernau. Like Latvian, the Estonian softwood lumber industry specializes in the manufacture of sizes and lengths used by the British freight-car building trade.

British imports of softwoods from Estonia have shown a progressive increase since 1921, when they amounted to only 20,716 loads valued at £120,182, and in 1925 they had risen to 136,217 loads valued at £580,084.

LITHUANIA

Owing to differences between Poland and Lithuania in 1920, terminating in the seizure of Vilna and closure of the River Niemen for floating logs from that region, exports of lumber from the latter country to the United Kingdom were practically brought to a standstill and in 1925 amounted to only 3,830 loads valued at £19,527.

Logs from the Vilna district, in the meantime, were diverted to the River Vistula and exported as lumber through Danzig. The floating of logs to Memel, the principal center of the Lithuanian lumber trade, had not been resumed and, until it is, it is improbable that exports to the United Kingdom will show any material increase.

CENTRAL EUROPEAN SOFTWOODS

Rumania, Czechoslovakia, and Yugoslavia are the most important central European countries shipping softwoods to the United Kingdom. While, however, imports from Rumania have been shown in British official statistics for many years the other two countries mentioned, only having been created sovereign States by the treaty of Versailles, did not appear until 1921.

Generally speaking, lumber from central Europe is inferior to the northern and eastern European varieties, but the low price at which it is sold has been an important factor in furthering its sale.

Imports are mostly in the form of rough lumber with a little square sawn timber, few sawmills being equipped with planing facilities in those countries from which it is obtained. The stock as a rule is square edged, bright, and well manufactured, the Swedish type of gang saw being universally used, and altogether presents an excellent appearance. The wood, however, is brittle, splits easily, and does not store well, deteriorating rapidly if exposed to the weather, and for that reason must pass into consumption as soon as possible after arrival before it is affected by the damp climate characteristic of the British Isles. A few years ago considerable trouble arose through the arrival of many shipments from Czechoslovakia and Rumania showing a large percentage of brown streak which, while scarcely noticeable when the stock was dry, became very pronounced if it got wet. According to one of the foremost British agents handling lumber from these countries this was caused through overfelling, so that large quantities of logs lay in the woods for months before being sawn into lumber and much dissatisfaction was caused among buyers on this account. Whether this is the correct explanation or not is immaterial, but the fact remains that it was considered a very serious defect and became the basis of many heavy claims. This trouble, however, has now been largely eliminated, and lumber showing brown streak is shipped only in the "inferior" or fourth quality to-day.

The bulk of the British imports are of spruce or whitewood, only a small quantity of pine or redwood, as it is called, being received from Czechoslovakia and Yugoslavia, while Rumania furnishes spruce only. Shipments are generally in "unsorted" (first, second, and third) quality. Occasional sales of "inferior" or fourth are made, but this is always shipped under a separate mark and on a separate bill of lading.

The following table shows British imports of central European softwood lumber during 1925:

Country	Quantity	Value
	Loads[1]	
Rumania	119,619	£495,267
Czechoslovakia	106,683	499,944
Germany	15,740	77,153
Yugoslavia	9,692	46,053

[1] Load equals 600 feet board measure.

The principal use of central European spruce is for house construction of the cheaper type where cost is a prime consideration. Large quantities are also used by the box and case making industries. The pine is not suitable for millwork but is mostly remanufactured into flooring and shelving in local planing mills.

There is little difference in value between the lumber shipped from any of these countries, its price depending to a large extent on the demand and the quantity available for export. Unlike the north European lumber market, prices are not made from a "base" with additions and deductions for the various sizes, but the price varies according to the market, also the specification buyers require.

RUMANIA

Imports of softwood lumber from Rumania steadily diminished before the Great War, and by 1913, according to British official statistics, had ceased altogether, none whatever being received during that year. The war naturally cut off all exports, but a start was made again in 1921, and by 1925 imports had reached a total of 119,619 loads valued at £495,267.

The following table shows imports of Rumanian rough softwood lumber into the United Kingdom for the years indicated:

Year	Quantity	Value
	Loads[1]	
1921	253	£1,800
1922	10,720	46,948
1923	81,472	356,963
1924	79,678	339,173
1925	119,619	495,267

[1] Load equals 600 feet board measure.

Only a few firms in Rumania are familiar with the lumber requirements of the British market, the bulk of that country's export trade being with the near eastern countries, which have always been their main outlet. Galatz on the Danube, and Constanza on the Black Sea, are the principal ports of loading, the latter being open practically all the year round, while Galatz is usually icebound from October or November until the following April or May, owing to the Danube freezing over. Rumanian softwood imported by the United Kingdom consists entirely of spruce lumber of "unsorted" quality in specifications similar to those shipped by the north European countries and is sold either as Rumanian or Galatz whitewood, after the port of loading of that name. The lengths as a rule run fairly long, which is an attraction to the British buyer. Imports of Rumanian lumber are widely distributed over the west coast of Great Britain, Liverpool, Manchester, and the Bristol Channel, and to a small extent Scotland, being the principal ports of entry. The reason for its use being restricted to these districts is principally that for building purposes they prefer spruce to pine, and also because large quantities of cheap lumber are used for packing cases by the Lancashire textile trade. London also uses considerable of it for cheap packing cases and boxes, but little for building purposes.

During the early summer of 1927 the market for an average specification of deals, battens, scantlings, and boards, was approximately £15 to £15 10s. per standard (1,980 feet board measure) c. i. f. regular United Kingdom ports, or from 30s. to £2 per standard below that for the lesser known and poorer Finnish stocks.

CZECHOSLOVAKIA

Most of the Czechoslovakian lumber arriving in Great Britain is loaded in vessels at Hamburg; it having been shipped to that port either by rail or in barges down the Elbe River. This river, however, is usually frozen over during January and February, and consequently is not open for traffic during those months.

Most of the softwood lumber imported is spruce, which is sometimes sold as Bohemian whitewood although there is no recognized name for it, the description used being largely left to the judgment of the dealer. In addition to the spruce, small quantities of pine occasionally enter the market, but it is doubtful if they exceed 10 per cent of the total import.

Czechoslovakian spruce is furnished in specifications similar to those of northern Europe, in lengths 10 feet and longer, with a very small percentage of 5 to 9 foot ends which are not usually shipped by the central European countries. It can generally be bought in special lengths, a considerable attraction in the United Kingdom. This stock sells for slightly less than Rumanian as a rule, the market value for an average specification during the early summer of 1927 being approximately £14 5s. to £15 per standard c. i. f. regular United Kingdom ports.

YUGOSLAVIA

While some rough spruce lumber is received from Yugoslavia the quantity is small and of little importance to the British import trade. It is sold as Bosnian whitewood and imported in unsorted quality, a mixture of first, second, and third only. The principal ports of loading are Fiume, Trieste, and Gruz, or Gravosa, as it is sometimes called.

Bosnian spruce is similar to the Rumanian and Czechoslovakian; it has a decided tendency to split and does not store well.

Shipments as a rule are well manufactured and bright and all sizes from 2 by 3 inches to 4 by 11 inches are furnished. Lengths are long as a rule and importers frequently require a percentage of 18 feet and longer to be included in their specification. "Unsorted" quality of Yugoslavian spruce lumber ordinarily sells for 5s. to 10s. per standard less than Czechoslovakian. Small quantities of pine or redwood lumber, also railroad ties, are received, but the wood has not proved satisfactory for this latter purpose on account of its not holding the spikes used to fasten the rail chairs firm, and the decided tendency it has to split. In addition to the lumber, efforts are being made to introduce "black pine" (*Pinus negricans* or *Pinus austriaca*) from the mountains of Montenegro as a substitute for American southern pine in the British market under the name of "Bosnian pitch pine." This wood contains a large amount of resin and only the best quality or butt cuts of timber are shipped to the British market. A usual specification of this timber will consist of 70 per cent 18 to 30 feet, 20 per cent 31 to 34 feet, and 10 per cent 35 to 40 feet; occasionally longer lengths are furnished but they are unusual, the dimensions run on the small size ordinarily, about 20 per cent 10 by 10 inches to 11 by 11 inches, 60 per cent 12 by 12 inches, and 20 per cent larger dimensions. The quantity available, however, is small and is not likely to have any effect on the sales of southern pine, with which it can not be compared as a structural timber.

GERMANY

Although not generally thought of as a lumber producing country, Germany does ship some pine and spruce to the United Kingdom. All the quantity, however, credited to that country in British statistics does not necessarily originate within its boundaries, but probably a portion is represented by stocks from Poland and Czechoslovakia, passing through for export, and credited to Germany in error.

AMERICAN SOFTWOODS

SOUTHERN PINE

Southern pine, or pitch pine as it is called in Europe, was one of the first American woods to be introduced to the British lumber market, reference being made to it in a Liverpool agent's circular dated February 1, 1823, the stock in that city being stated as not exceeding 3,000 cubic feet. Two years later, the same company's circular stated, "Pitch pine seldom enquired for, the importation last year was only 20,170 cubic feet and stock is considerable."

It is interesting to compare these figures with those for 1926 for the same district, which show the great expansion in the trade since that time. Manchester, of course, was not a seaport until many years later, when the ship canal was built, so that all imports for that district necessarily passed through Liverpool 100 years ago. The imports of southern pine in 1926 at Liverpool (including Birkenhead and Garston) were: Sawn timber 649,000 cubic feet and lumber 842,000 cubic feet; at Manchester, sawn timber 704,000 cubic feet and lumber 580,000 cubic feet.

The early imports were in the form of hewn timber used principally for masts and spars of sailing vessels, the building of which at that period was an important part of the British shipbuilding industry. A little later sawn timber made its appearance and for many years the importation of southern pine was confined almost exclusively to timber with a few deals for stowage purposes, and not until much later were the higher qualities of lumber brought in. Most shipments were made in sailing vessels, and the problem of getting the timber, which was so much longer than anything contemplated when the vessels were built, through the hatches was a difficult one. This was overcome, however, by cutting openings in the bows, called "bow ports," through which the timber was loaded and discharged.

FIG. 10.—Hauling southern pine sawn timber. "A pause for dinner"

For many years southern pine in the British lumber trade was associated with such ports as Darien, Savannah, Mobile, Pascagoula, and Pensacola, and not until later years were shipments received from New Orleans, Port Arthur, Galveston, and Gulfport, in any quantity.

The British demand has always been largely for the long-leaf variety, short-leaf stock never finding more than a very small market.

the central European countries. It can generally be bought in special lengths, a considerable attraction in the United Kingdom. This stock sells for slightly less than Rumanian as a rule, the market value for an average specification during the early summer of 1927 being approximately £14 5s. to £15 per standard c. i. f. regular United Kingdom ports.

YUGOSLAVIA

While some rough spruce lumber is received from Yugoslavia the quantity is small and of little importance to the British import trade. It is sold as Bosnian whitewood and imported in unsorted quality, a mixture of first, second, and third only. The principal ports of loading are Fiume, Trieste, and Gruz, or Gravosa, as it is sometimes called.

Bosnian spruce is similar to the Rumanian and Czechoslovakian; it has a decided tendency to split and does not store well.

Shipments as a rule are well manufactured and bright and all sizes from 2 by 3 inches to 4 by 11 inches are furnished. Lengths are long as a rule and importers frequently require a percentage of 18 feet and longer to be included in their specification. "Unsorted" quality of Yugoslavian spruce lumber ordinarily sells for 5s. to 10s. per standard less than Czechoslovakian. Small quantities of pine or redwood lumber, also railroad ties, are received, but the wood has not proved satisfactory for this latter purpose on account of its not holding the spikes used to fasten the rail chairs firm, and the decided tendency it has to split. In addition to the lumber, efforts are being made to introduce "black pine" (*Pinus negricans* or *Pinus austriaca*) from the mountains of Montenegro as a substitute for American southern pine in the British market under the name of "Bosnian pitch pine." This wood contains a large amount of resin and only the best quality or butt cuts of timber are shipped to the British market. A usual specification of this timber will consist of 70 per cent 18 to 30 feet, 20 per cent 31 to 34 feet, and 10 per cent 35 to 40 feet; occasionally longer lengths are furnished but they are unusual, the dimensions run on the small size ordinarily, about 20 per cent 10 by 10 inches to 11 by 11 inches, 60 per cent 12 by 12 inches, and 20 per cent larger dimensions. The quantity available, however, is small and is not likely to have any effect on the sales of southern pine, with which it can not be compared as a structural timber.

GERMANY

Although not generally thought of as a lumber producing country, Germany does ship some pine and spruce to the United Kingdom. All the quantity, however, credited to that country in British statistics does not necessarily originate within its boundaries, but probably a portion is represented by stocks from Poland and Czechoslovakia, passing through for export, and credited to Germany in error.

AMERICAN SOFTWOODS

SOUTHERN PINE

Southern pine, or pitch pine as it is called in Europe, was one of the first American woods to be introduced to the British lumber market, reference being made to it in a Liverpool agent's circular dated February 1, 1823, the stock in that city being stated as not exceeding 3,000 cubic feet. Two years later, the same company's circular stated, "Pitch pine seldom enquired for, the importation last year was only 20,170 cubic feet and stock is considerable."

It is interesting to compare these figures with those for 1926 for the same district, which show the great expansion in the trade since that time. Manchester, of course, was not a seaport until many years later, when the ship canal was built, so that all imports for that district necessarily passed through Liverpool 100 years ago. The imports of southern pine in 1926 at Liverpool (including Birkenhead and Garston) were: Sawn timber 649,000 cubic feet and lumber 842,000 cubic feet; at Manchester, sawn timber 704,000 cubic feet and lumber 580,000 cubic feet.

The early imports were in the form of hewn timber used principally for masts and spars of sailing vessels, the building of which at that period was an important part of the British shipbuilding industry.

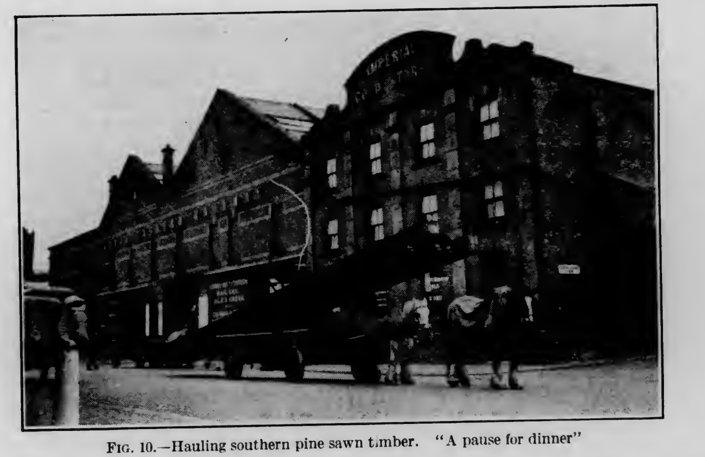


FIG. 10.—Hauling southern pine sawn timber. "A pause for dinner"

A little later sawn timber made its appearance and for many years the importation of southern pine was confined almost exclusively to timber with a few deals for stowage purposes, and not until much later were the higher qualities of lumber brought in. Most shipments were made in sailing vessels, and the problem of getting the timber, which was so much longer than anything contemplated when the vessels were built, through the hatches was a difficult one. This was overcome, however, by cutting openings in the bows, called "bow ports," through which the timber was loaded and discharged.

For many years southern pine in the British lumber trade was associated with such ports as Darien, Savannah, Mobile, Pascagoula, and Pensacola, and not until later years were shipments received from New Orleans, Port Arthur, Galveston, and Gulfport, in any quantity.

The British demand has always been largely for the long-leaf variety, short-leaf stock never finding more than a very small market.

The reason for this is that southern pine has never been favored for furniture making, as in some of the continental countries, the less expensive hardwoods being preferred, nor for interior finish and millwork, north European pine being used almost exclusively for these purposes.

Prior to the war, there was a small business done in North Carolina pine, principally in dressed and matched stock for office partitions and interior finish, also some 1 by 12 inch dressed for shelving. During the war, however, it was impossible to get supplies, so that other species were substituted and the market has never been regained. It can well be said that pitch pine is a household word in Great Britain; it needs no recommendation and only its increased price since the war prevents its greater use.

Next to Argentina, the United Kingdom is the most important foreign market for southern pine, and in 1926 took over 97,000,000 feet, composed of approximately 52,000,000 feet sawn and 5,000,000 feet hewn timber, and 40,000,000 feet lumber, practically all rough sawn. However, 1926 was a year of great industrial depression in the United Kingdom, for which, first the general strike of May 1, followed immediately by the coal strike, which lasted until the following November, was largely responsible. In spite of this unprecedented situation, imports of southern pine were only about 11,000,000 feet less than the previous year. Prior to the war southern pine was frequently imported in full cargo lots of from 2,000,000 to 3,000,000 feet, on account of the inability to secure liner tonnage to many British ports from the producing districts, and also because tramp vessels could frequently be chartered at a lower cost than the liner tonnage. Since the advent of the United States Shipping Board, however, frequent regular services are now available to most of the principal British ports, and the large investment necessary for full cargoes makes them undesirable except to a few outports, so that at the present time the import trade is largely done in parcel lots by regular liners, buyers operating chiefly on a hand-to-mouth basis.

Ocean freight rates.—Early in 1927 the ocean rate on southern pine from the Gulf of Mexico, through which most of it is shipped, was quoted at $15 per thousand feet for regular United Kingdom ports such as Liverpool, Manchester, London, Avonmouth, and Glasgow, with $1 extra for the east coast, Ireland, and the outports. When full cargoes are shipped they are usually made on a Pix Pinus form of charter, but as so small a percentage of the total import is carried in full cargo lots details of this would be of little general interest.

Volume of trade.—British statistics do not give separate figures for the imports of southern pine, but the following figures, taken from official United States sources and published in "Foreign Commerce and Navigation" by the Department of Commerce, show the United States exports of southern pine to the United Kingdom in 1913 as 255,813,000 feet board measure, valued at $5,621,107; and in 1926 as 97,335,000 feet board measure, valued at $4,391,239.

Only very few round logs were imported and most of the timber is sawn, only specially long lengths now being imported hewn. The lumber, with the exception of a very small quantity of flooring, is all rough sawn.

There has been considerable decline in the importation of southern pine since the last pre-war year, largely owing to its increased value

(causing greater use of substitutes and less valuable species, most pronounced in timber) and to the lesser use of it for the furnishing of churches and schools.

Import centers.—Liverpool, Glasgow, London, Manchester, Belfast, and Newcastle-on-Tyne are the principal ports of entry for southern pine in the United Kingdom, although shipments are also received at many other ports.

SPECIFICATIONS

Southern pine is sold in the United Kingdom according to the grading rules of the Gulf Coast Classification as of 1919 and 1923, issued by the Southern Pine Association of New Orleans, La., with which the British import trade is thoroughly familiar.

Decking.—2½ and 3 by 5 inches, 18 feet and longer, 25 to 27 feet lineal average. Both prime and heart face are imported, but only very small quantities of the latter. This stock must be cut full so as to finish to the above net sizes when dressed.

Extra prime.—1 to 4 by 8 to 10 inches, 10 feet and longer; 1 to 4 by 11 inches and wider, 10 feet and longer; 1 and 1¼ by 4 to 6 inches, 10 feet and longer. Of these, 1¼ by 8 inches and wider is the most popular.

Rio or Genoa prime.—3, 3½, and 4 by 9 and 11 inches, chiefly 3 and 4 by 9 inches, 10 feet and longer; 3 by 6 inches, 10 feet and longer; 2½ and 3 by 3 inches, 10 feet and longer; 2 by 3, 4, and 6 inches, chiefly 2 by 3 and 6 inches, 10 feet and longer; 1 and 1¼ by 6 inches, 10 feet and longer; 1¼ and 1½ by 3 inches, chiefly 1¼ inches, 10 feet and longer.

Kiln-dried saps.—1 by 4 inches, 10 feet and up; 1 by 6 inches, 10 feet and up; 1 by 12 inches, 10 feet and up; 1 by 4 inches, 4 to 8 feet.

Merchantable.—3 and 4 by 9 inches, 10 feet and up; 6 by 9 inches, 16 feet and up, 26 to 27 feet lineal average; 6 by 12 inches, 16 feet and up; 3 by 6 inches, 10 feet and up. The principal demand is for 6 by 9 and 12 inches, this quality in deals and 3 by 6 inches not being favored.

Square edge and sound.—3 by 9 inches, 10 feet and up. Only very little of this quality is now imported, its use having virtually disappeared owing to the advance in ocean freight rates since the war.

Sawn timber.—6 by 6 inches to 10 by 10 inches, average, 8 inches, 16 feet and up, 28 feet lineal average; 9 by 9 inches and up, average, 30 cubic feet, 16 feet and up; 9 by 9 inches and up, average, 32½ cubic feet, 16 feet and up; 9 by 9 inches and up, average, 35 cubic feet, 16 feet and up; 12 by 12 inches and up, average, 40 cubic feet; 12 by 12 inches and up, average, 45 lineal feet and up, average, 50 feet, known as Specials.

Hewn timber.—Specials, 55 feet and up, 15 by 15 inches and up, and 100 cubic average.

Before the war some railroad ties of southern pine were used, but since that time their price has made it impossible for them to compete with other less valuable species.

PRINCIPAL USES

For many years southern pine decking was extensively used in British shipyards, but with the great surplus of tonnage and reduced volume of trade after the postwar boom had collapsed this industry sunk to exceedingly low proportions.

Cost is now the prime consideration in the shipbuilding industry, and although the merits of this species for decking purposes are admitted, its use has been supplanted to a considerable extent by other species less expensive. Extra prime lumber is largely used for the furnishing of churches and schools. Of recent years, however, the call for southern pine for this purpose has been considerably reduced owing to other species being favored. One of the best sellers in this market is 9-inch Rio deals, used largely for the manufacture of floor blocks, complete details of which are given in the section on "Flooring". In addition, 2 by 3 and 6 inches, and to a lesser extent, 3 by 9 inches, in the same grade are used in fairly large quantities for the manufacture of mattress frames. The demand for southern pine flooring is quite small, the bulk used being made in local sawmills out of Rio deals and sawn timber. Hewn timber is used to some extent for railway signal posts, in shipyards, and for dock construction and other purposes where extremely large sizes are required.

Kiln-dried saps have never been used to any great extent in the United Kingdom, small quantities only being imported for interior finish, the backing of high-class furniture, and 1 by 12 inch dressed for shelving purposes.

The building of docks requires a very large amount of timber for temporary bulkheading and this constitutes a large part of the demand for southern pine timber in this country; other uses being ship booms, steamship landing and amusement piers at seaside resorts, breakwaters, and canal locks. In this connection it might be well to state that many of the British seaports are situated on tidal rivers, and the docks, unlike most American, are not piers built out in the water but are dug out of the land, forming an inland water basin. Superstructures at pitheads in the colliery districts also constitute an important outlet.

Heavy construction work uses large quantities of both sawn timber and 6 by 12 inch, particularly where a long span is required such as in bridge construction.

For cutting up, where small quantities of special sizes are required, timber is generally used and the quantity consumed for this purpose must be considerable.

In some of the British shipyards decking is still manufactured out of sawn timber, 40 cubic-foot average, 12 by 12 inches and up being most frequently used for this purpose.

Competition.—Since the war competition from other species and materials has been most severe in the United Kingdom, largely on account of the increased value of southern pine. Price in most lines of industry is now a prime consideration, and regardless of personal preference, low cost usually wins out. For this reason the use of concrete piling has made considerable headway for dock construction, also for railway signal posts, and it is probable that its use for these purposes will increase in the future. Southern pine has also been replaced to some extent by Douglas fir and laminated deals are also being used in place of timber to a greater extent than ever before in heavy construction work.

Before the war there was a limited market for southern pine railroad ties, but for some years now they have been unable to compete with less valuable species.

Of late years efforts have been made to introduce Bosnian black pine into the United Kingdom, under the name of Bosnian pitch pine, as a substitute for the genuine variety shipped from the United States. Only small quantities of suitable timber are available for

export, however, and in spite of its much lower price little headway has been made, so that it is doubtful if it will ever be a serious contender.

COMPLAINTS FROM BRITISH BUYERS

There are few complaints made by British buyers against southern pine except that of high price, the most serious of these being irregular sawing and discolored sap. It is doubtful, however, if these complaints are more than might normally be expected in business done in a natural product and, generally speaking, shipments are quite satisfactory.

EXTENSION POSSIBILITIES

For ordinary purposes there would seem to be little prospects for the increased use of southern pine in the United Kingdom. Competition from substitutes and less valuable species is likely to increase rather than grow less, so that if there is to be any extension, other outlets than those at present will have to be developed.

The most favorable of these would seem to be for floor blocks and short-length strip flooring. As already stated, southern pine needs no recommendation in this market. It is well and favorably known from one end of the country to the other and only the question of price prevents its greater use. The high ocean freight rate from the United States to the United Kingdom effectually prevents the greater use of the lower grades so that it is for the higher grades that new outlets must be developed. For these, however, there is an economic limit and in ordinary specifications no increased use is probable. Taking all factors into consideration, it would seem that the best way to increase the use of southern pine in Great Britain is by developing a market for such stock as can be manufactured by closer utilization of the log than at present practiced, or by the sale of short lengths in domestic and export dimensions which are accumulated during the process of manufacture and which can be sold at a sufficient discount under the price for regular lengths as to induce their use.

In order to develop this trade it will be necessary for American manufacturers to cooperate very closely with their British agents and a nontechnical description of the grades, if such is offered, would be of considerable value because the American grades are totally unknown in the British lumber trade. Of great importance, however, in introducing new grades or sizes to a foreign market is continuity of supply, and little benefit will accrue unless buyers can safely reckon on getting regular deliveries. Of equal importance to regularity of supplies is stability of prices, and unless wide or constant fluctuations can be prevented it will be exceedingly difficult to persuade importers to carry stocks of new items. If this can be done, the time would appear opportune for their introduction, and with careful and proper handling the demand for them should show a steady increase.

DOUGLAS FIR

Douglas fir is usually sold in the United Kingdom either as British Columbian or Oregon pine, sometimes as Columbian pine, but seldom under its true name of Douglas fir. It has been known in the United

Kingdom for many years, the first shipments arriving in full sailing-vessel cargoes by way of Cape Horn about 50 years ago.

These early shipments consisted almost entirely of the smaller sawn timbers, principally 12 to 14 inches square, in long lengths, and were used largely for temporary bulkheading in dock building and other construction work where long lengths were desired. In addition to timber, small quantities of deals used for stowage purposes were also included in these cargoes.

The fact that it had to be imported in full cargo lots, necessitating a large investment, coupled with the limited demand, considerably retarded its sale. While the opening of the Panama Canal in 1914 brought the source of supply many thousands of miles nearer and made liner parcels possible, no advantage could be taken of these changed conditions until the termination of the World War in 1919. Since that time the full-cargo business has completely disappeared, imports being almost exclusively in parcel lots by regular liners.

Douglas fir is imported into the United Kingdom from both the United States and British Columbia. Unfortunately British statistics do not give separate figures for this species, but that its use is steadily growing in this market is unquestionable. The large sizes in which it can be obtained, its comparative freedom from defects, and relatively low cost are gradually overcoming the inherent prejudice of the British consuming industries. The desire to trade within the Empire has also stimulated trade in this species and, in response to representations by the Dominion authorities, many public and semipublic bodies such as railroads and municipalities now include it in their tenders where formerly other species only were specified.

Not until 1922 were export data of Douglas fir compiled by the United States, the following figures taken from "Foreign Commerce and Navigation of the United States" published by the Department of Commerce show that exports of Douglas fir to the United Kingdom in 1924 amounted to 18,664,000 board feet, valued at $610,584, and in 1925 amounted to 39,177,000 board feet, valued at $1,115,992.

SPECIFICATIONS

The demand for Douglas fir by the British lumber trade is principally for decking, No. 2 clear and better, and merchantable qualities. The specifications are many and various, those most in demand being as follows:

Decking.—2½ and 3 by 5 inches, 20 feet and longer to average 28 to 30 feet. Decking is always edge grain and is required to be cut full so as to finish to sizes named.

No. 2 clear and better.—3 to 6 by 10 inches and wider, 12 feet and longer; 3 and 4 by 9 and 11 inches, 12 feet and longer; 1, 1¼, 1½, and 2 by 8 inches and wider, chiefly 9 and 11 inches, 10 feet and longer; 4, 4¼, 4½, 4¾, 5, 5½, 6, 7, 8, and 9 inches square, 10 feet and longer; 1¼ by 4 and 4½ inches, 8 to 18 feet, edge-grain strips.

Merchantable.—6 by 12 inches, 16 to 40 feet; 4 by 12 inches, 16 to 32 feet; 3 and 4 by 9 and 11 inches, 12 feet and longer; 10 by 10 to 24 by 24 inches, chiefly 12 by 12 to 14 by 14 inches, 16 feet and longer; ties, 8 feet 6 inches by 10 by 5 inches and 9 feet by 10 by 5 inches; crossings, 6 by 12 and 7 by 14 inch 8 to 25 feet long, rising in 6-inch multiples.

TERMS OF SALE

Practically all sales to this market are on a c. i. f. basis and on terms of the current list as published by the Pacific Lumber Inspection Bureau (Inc.), Seattle, Wash., whose certificate as to quantity, grade, and condition is attached to the documents and must be considered as final. While some importers object to these terms, the difficulty in getting them accepted is becoming less.

HANDLING OF IMPORTS

On arrival in Great Britain, Douglas fir receives no different handling than any other softwood. In some ports the lumber is landed in covered sheds, or discharged overside into barges, as in London, while in others it is landed in the open. Timber at some ports is discharged into the water and stored in ponds, while at others it is piled either in the open or under sheds. As regards importers' and dealers' yards, generally speaking shed space is only provided for hardwoods, all softwoods usually being stored in the open, their sole protection from the weather being a top covering of boards. In view of the moist climate prevalent in the United Kingdom, it can be readily understood that sappy unseasoned stock rapidly discolors, a serious defect in the eyes of the British consumers. Douglas fir is the only lumber shipped green that enters the United Kingdom, but fortunately it has little sap, so that the weather has little effect upon it.

PRINCIPAL USES

No. 2 clear and better lumber is used almost exclusively for the better class of millwork and interior finish. Some is also used in the domestic manufacture of doors, but its use for this purpose is restricted owing to the great majority of doors used being imported ready-made at prices with which the domestic article can not compete. Next to the Russian White Sea pine, Douglas fir is preferred to any other softwood for high-class millwork, and the demand for No. 2 clear and better grade is dependent to a large extent on the available supplies of the second quality deals of that species. Should these supplies be insufficient to meet all the requirements of the market, Douglas fir is called upon to make up the shortage.

During the past few years there has developed a demand for 4 to 6 inch clear squares from the textile machinery manufacturers. These squares are turned for weavers' and cloth beams and are replacing Canadian white pine formerly used almost exclusively for this purpose. Occasionally, special lengths, 16, 21, 26, and 32 feet, are asked for in 4¾ by 4¾ inches.

On account of the saving in transportation, flooring and dressed stock for interior finish are being imported in increasing quantities, although the total is only small as yet. Transportation charges being so great a part of the delivered value of Douglas fir, the importation of dressed lumber should increase in the future.

In addition to these items, there is also a small demand for 1¼ by 4 and 4½ inch kiln-dried edge-grain strips, which are manufactured into flooring in local factories.

The use of Douglas fir decking, which is always imported edge grain, has increased considerably during the past few years, largely on account of its low price in comparison with other species used for this purpose. Cost is a prime consideration in the majority of vessels now being built, and British yards which are meeting very severe competition from those on the European Continent, are turning to this species as a money saver to a greater extent than ever before. There seems little likelihood of pre-war conditions ever returning in the shipbuilding industry, so it may be assumed that the use of Douglas fir decking will continue to increase.

The merchantable quality of Douglas fir is used largely for heavy construction work, principally dock building, railroad bridges, and other places where long lengths are required. Selected timbers are also used for flagstaffs and masts of sailing barges and large racing yachts. Such railroad ties as are imported are usually of "tie grade," which is somewhat lower than ordinary merchantable. This species, however, has made little headway against the Baltic and north European pine ties, which are greatly preferred by the British railroads. For further details on this matter, see section on "Railroad ties."

FIG. 11.—Douglas fir flagpole. Height, 214 feet; base, 33 by 33 inches; top, 12 inches in diameter

During the early summer of 1927, several British railroads requested, for the first time, alternate prices for both merchantable Douglas fir and north European pine lumber in car-building dimensions, but the lowest quotations for fir were considerably higher than for the north European and Baltic pine, so that there is little possibility of it being used as long as this discrepancy exists.

Douglas fir floor blocks are also imported in fair quantities, for further details of which see section on "Flooring."

COMPLAINTS

The principal complaints made against Douglas fir by British buyers are irregularity of sawing, coarse grain, and steps in wide circular sawn planks. These steps are apparently caused by a log being of too great a diameter to be cut with one saw and two have been used with the result that part of the piece is thicker than the rest by the gauge of the saw.

Irregular sawing is another common cause of complaint, and is especially disliked in boards. These are always dressed before use, and it is frequently necessary to pass them several times through the planing machine before a smooth flat surface can be obtained. Buyers will always give preference to an exporter who ships even-manufactured boards, at anywhere near competitive prices. The use of this species for paving blocks is also prevented, to a great extent, by this irregularity of sawing, according to the largest manufacturer of wood paving blocks in Great Britain.

Many complaints are made against coarse-grained stock being shipped to this market against No. 2 clear and better contracts which is quite unsuitable for millwork. Only old growth, close-grained yellow fir should be shipped against these contracts. Not only is this a source of annoyance to the buyer, but it prejudices the whole species and adds to the difficulties of selling it in this market. American shippers who know the kind of stock required by this market, and who base their quotations accordingly, also suffer from this practice as manifestly lower prices can be made for coarse-grained stock, and this is probably one reason for the wide range in quotations received in many instances against a particular inquiry.

CANADIAN COMPETITION

Largely on account of Canadian competition, imports of Douglas fir into the United Kingdom from the United States showed a considerable decrease during 1927, totaling 22,014,000 feet board measure, as compared with 39,177,000 feet in the previous year. The desire to buy as much as possible within the Empire is diverting an increasing volume of Douglas fir business to Canada. British public and semipublic bodies, such as the railroads and municipalities, now specify for the product of British Columbia in their tenders for Douglas fir, and competition from that country is likely to increase. Many importers also are now asking for British Columbia stock and, while they may not be prepared to pay more money for it, at even prices the business is likely to be placed within the Empire.

TRADE EXTENSION

One of the greatest handicaps to the greater use of Douglas fir in the United Kingdom is the constant and wide fluctuations in c. i. f. prices. It is not uncommon for differences of from £1 10s. to £3 per standard to be received from different shippers on the same day. As a consequence of these conditions, many importers will not stock Douglas fir, as they say the profits are not commensurate with the risks taken. A rise or fall of from 5s. to 10s. per standard is the maximum for European softwoods over a fairly long period, while fir quotations change almost daily. These constant changes, more than any other single factor, are retarding the sale in the United Kingdom, and a closer cooperation among shippers, if it is possible, would be of great benefit. It has been said by a prominent British agent interested in its sale that the Douglas fir export business has become largely a matter of freight speculation owing to the great proportion of the selling cost being made up of transportation charges. Stability of freight rates would if possible be of the greatest assistance in increasing the sale of this species in the United Kingdom market.

account of its low price in comparison with other species used for this purpose. Cost is a prime consideration in the majority of vessels now being built, and British yards which are meeting very severe competition from those on the European Continent, are turning to this species as a money saver to a greater extent than ever before. There seems little likelihood of pre-war conditions ever returning in the shipbuilding industry, so it may be assumed that the use of Douglas fir decking will continue to increase.

The merchantable quality of Douglas fir is used largely for heavy construction work, principally dock building, railroad bridges, and other places where long lengths are required. Selected timbers are also used for flagstaffs and masts of sailing barges and large racing yachts. Such railroad ties as are imported are usually of "tie grade," which is somewhat lower than ordinary merchantable. This species, however, has made little headway against the Baltic and north European pine ties, which are greatly preferred by the British railroads. For further details on this matter, see section on "Railroad ties."

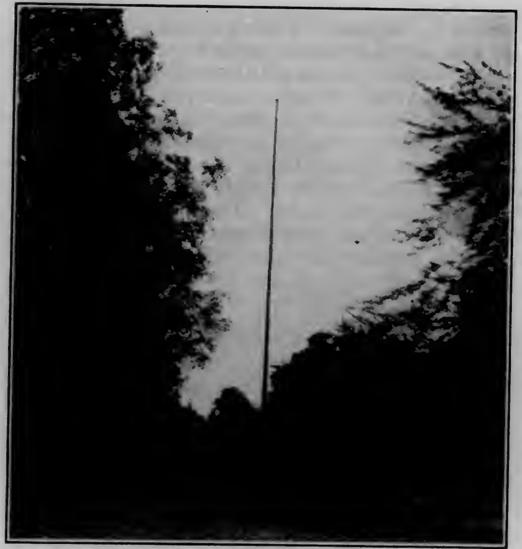


FIG. 11.—Douglas fir flagpole. Height, 214 feet; base, 33 by 33 inches; top, 12 inches in diameter

During the early summer of 1927, several British railroads requested, for the first time, alternate prices for both merchantable Douglas fir and north European pine lumber in car-building dimensions, but the lowest quotations for fir were considerably higher than for the north European and Baltic pine, so that there is little possibility of it being used as long as this discrepancy exists.

Douglas fir floor blocks are also imported in fair quantities, for further details of which see section on "Flooring."

COMPLAINTS

The principal complaints made against Douglas fir by British buyers are irregularity of sawing, coarse grain, and steps in wide circular sawn planks. These steps are apparently caused by a log being of too great a diameter to be cut with one saw and two have been used with the result that part of the piece is thicker than the rest by the gauge of the saw.

Irregular sawing is another common cause of complaint, and is especially disliked in boards. These are always dressed before use, and it is frequently necessary to pass them several times through the planing machine before a smooth flat surface can be obtained. Buyers will always give preference to an exporter who ships even-manufactured boards, at anywhere near competitive prices. The use of this species for paving blocks is also prevented, to a great extent, by this irregularity of sawing, according to the largest manufacturer of wood paving blocks in Great Britain.

Many complaints are made against coarse-grained stock being shipped to this market against No. 2 clear and better contracts which is quite unsuitable for millwork. Only old growth, close-grained yellow fir should be shipped against these contracts. Not only is this a source of annoyance to the buyer, but it prejudices the whole species and adds to the difficulties of selling it in this market. American shippers who know the kind of stock required by this market, and who base their quotations accordingly, also suffer from this practice as manifestly lower prices can be made for coarse-grained stock, and this is probably one reason for the wide range in quotations received in many instances against a particular inquiry.

CANADIAN COMPETITION

Largely on account of Canadian competition, imports of Douglas fir into the United Kingdom from the United States showed a considerable decrease during 1927, totaling 22,014,000 feet board measure, as compared with 39,177,000 feet in the previous year. The desire to buy as much as possible within the Empire is diverting an increasing volume of Douglas fir business to Canada. British public and semipublic bodies, such as the railroads and municipalities, now specify for the product of British Columbia in their tenders for Douglas fir, and competition from that country is likely to increase. Many importers also are now asking for British Columbia stock and, while they may not be prepared to pay more money for it, at even prices the business is likely to be placed within the Empire.

TRADE EXTENSION

One of the greatest handicaps to the greater use of Douglas fir in the United Kingdom is the constant and wide fluctuations in c. i. f. prices. It is not uncommon for differences of from £1 10s. to £3 per standard to be received from different shippers on the same day. As a consequence of these conditions, many importers will not stock Douglas fir, as they say the profits are not commensurate with the risks taken. A rise or fall of from 5s. to 10s. per standard is the maximum for European softwoods over a fairly long period, while fir quotations change almost daily. These constant changes, more than any other single factor, are retarding the sale in the United Kingdom, and a closer cooperation among shippers, if it is possible, would be of great benefit. It has been said by a prominent British agent interested in its sale that the Douglas fir export business has become largely a matter of freight speculation owing to the great proportion of the selling cost being made up of transportation charges. Stability of freight rates would if possible be of the greatest assistance in increasing the sale of this species in the United Kingdom market.

Strange as it may seem, the exceedingly moderate prices at which the large dimensions common in Douglas fir are sold raise a suspicion in the minds of many buyers, inclining them to the idea that there must be something wrong with it to make such prices possible. Only in Douglas fir and southern pine, of all the softwoods imported into the United Kingdom, can such large dimensions be obtained, and in the opinion of several agents very close to the situation higher prices could as readily be obtained for fir than those at present, particularly for the merchantable grade, and that intensive competition among shippers themselves is largely responsible for the low price at which it is sold. In no other species is there such competition for business in this market as among the shippers of Douglas fir.

The various names under which Douglas fir is sold in this market is the cause of much confusion in the trade; and, unbelievable as it may seem, there are still importers who claim that Oregon pine is a different wood from Douglas fir. The need for a universal name is great, and a statement from some official rather than a trade source broadcast to the British lumber trade would be of the greatest possible benefit.

It would also be of considerable value if means were taken not only to bring to the attention of the importing and consuming industries its physical and mechanical properties, but also an explanation of the various grades of Douglas fir usually shipped to the United Kingdom and their uses in nontechnical language easily understood by builders, contractors, carpenters, architects, and other nonlumbermen. The best method of distributing this information in Great Britain would be by means of a booklet issued preferably from an official rather than a trade source, thus bearing the stamp of impartiality. Extracts from it should also be advertised in the various lumber, building-trade, and architects' journals, so as to give the widest distribution possible.

Illustrations showing the uses to which Douglas fir is particularly adapted should also be included in such a booklet, special attention being given to those showing the beauty of its figure. So far efforts to increase the sale of Douglas fir have been left entirely to the British agents, but the time has now arrived when the shippers will have to take an active part if they wish to increase their sales to any material extent. This can not be done individually, and the cooperative spirit that is so manifest in America must be used in foreign markets also.

OUTLOOK

While Douglas fir has been sold in the British market below its real value for many years, largely owing to the severe competition for business among the many exporters, the result has not been altogether a loss. Its low price has given it the widest distribution, and it is known from one end of Great Britain to the other. Its use is steadily increasing, and while no figures are available, it is the opinion in the trade that greater quantities are being imported than ever before. In price it approximates the upper grades of north European softwoods, and its chief handicaps are largely of the shippers' own making. If these can be overcome, and its peculiar merits properly brought to the attention of the agents, importers, dealers, and consuming industries, together with care in proper fulfillment of contracts, the use of Douglas fir should materially increase.

SITKA SPRUCE

Although known in the United Kingdom for many years, the importation of Sitka or silver spruce, as it is generally called, was of very small proportions during the years preceding the Great War. The development of the airplane, however, and particularly its use for war purposes, created a tremendous demand for this species, owing to it being the only wood available that could meet the stringent requirements for airplane construction. Its qualities of toughness, strength, flexibility, and resilience, combined with lightness and uniformity of texture, made it particularly suitable for that purpose, and it was largely the demand for airplane construction that eventually brought Sitka spruce into prominence in the British lumber market.

Supplies were furnished by both the United States and British Columbia, a very superior grade of No. 2 clear and better being at first imported. A usual specification called for was 3 to 6 inches thick by 6 inches and wider, 18 to 40 feet long, with 10 to 15 per cent of 10 to 17 feet admitted. From these shipments the factory inspectors selected airplane stock, the quantity varying with each shipment, naturally being much greater in some than others.

By this method of obtaining airplane material, however, very large quantities of No. 2 clear and better lumber not good enough for that purpose were accumulated by the importers for which a market had to be created. Nevertheless, the price which was paid by manufacturers for the airplane stock was such that what was left could be sold at a very material reduction under the contract price, or even the value of a regular grade of No. 2 clear and better, and still leave the importer a profit on the entire parcel. As a result of this abnormal state of affairs created entirely by the extraordinary demand for airplane lumber, a fictitiously low value was placed upon the regular No. 2 clear and better grade of Sitka spruce and a demand created for it by unsound marketing methods.

While this state of affairs was developing in the United Kingdom, a change had also taken place on the Pacific coast, manufacturers having commenced about 1922–23 to grade their lumber for airplane quality, using the American Government grading rules as a basis, so that there, also, similar stocks of No. 2 clear and better were being accumulated. It was found, however, that these shipments even when so graded would not pass the very severe inspection tests prevailing in Great Britain, and several British firms who specialized in this business sent their own representatives to the Pacific coast to purchase and take up their requirements.

As long as the demand for airplane quality continued, the difficulties of selling regular No. 2 clear and better stock had been eased somewhat by the attractive price at which it could be sold, and a steady demand had been established. However, with the development of the all-metal plane, purchases of Sitka spruce by the British Government and various construction companies were reduced to very small proportions, its use being limited to repair work and experimental purposes, so that the great factor that had enabled a low price to be put on the ordinary grade of lumber disappeared.

As a consequence of this state of affairs, the price of No. 2 clear and better stock, manufactured after this change had taken place, became subject to normal marketing conditions and governed by the law of supply and demand the same as any other species. There were, however, still large stocks both in Great Britain and on the Pacific coast that had accumulated during the fulfillment of previous orders for airplane quality to be disposed of, and it is from these that the British market's requirements have largely been filled during the past few years.

Whether this business can be retained when these stocks are disposed of and higher prices are asked is somewhat doubtful for the reason that its principal uses so far have been for the manufacture of high-class millwork and interior finish and to a small extent for motorbus bodies. A little has also been used by the Scottish shipbuilders for interior finish and shelving, but for these purposes other less expensive species are just as well liked and have already, to a large extent, replaced Sitka spruce, which was used only on account of its low price. It is said by a prominent importer, who has handled large quantities of this species, that it is doubtful if more than a comparatively small business can be done in this market unless 3 to 6 by 6 inches and wider No. 2 clear and better—the specification mostly shipped, although a small quantity of 1-inch boards are also used—can be sold at approximately £25 to £28 per standard, c. i. f., United Kingdom, depending on the price of competitive species. The specifications in which it is furnished are also a handicap, and it would be a decided help if special sizes, such as 3 and 4 by 9 inches, could be supplied.

In addition to the purposes already mentioned, there is a very small demand for kiln-dried, edge-grain, No. 2 clear and better lumber, 1 by 4 to 6 inches, 8 to 16 feet long, for piano sounding boards. This stock must be as white as possible and free from sap, pink, or red wood, with annular rings not less than 10 to the inch. The inspection is very severe, however, and it is doubtful if the volume of business would justify American exporters going after it.

Many heavy claims have been paid on shipments of Sitka spruce arriving in the United Kingdom in a discolored condition and on no account should it be loaded without having been seasoned for at least 60 days on sticks so as to arrive in a dry, bright condition. Discoloration is considered a serious defect; particularly in factory lumber, and allowances are always heavy on parcels failing to arrive "bright." American exporters of this species, therefore, should pay particular attention to this matter, otherwise there is danger that even if the price question can be overcome the condition will cause this market to be lost or at least severely curtailed as an outlet for Sitka spruce.

WHITE PINE, WESTERN PINE, AND SUGAR PINE

According to the statistics of the United States Customs, a total of 2,044,000 feet, board measure, of lumber of these three species were exported to the United Kingdom during 1926. While, however, sugar pine is only obtainable from the United States, some western pine is also imported from British Columbia, and practically all the white pine used in the United Kingdom comes from the eastern Provinces of Canada. No separate figures, however, are kept in British statistics, so that it is impossible to ascertain the total importation of any of these species.

WHITE PINE

It is doubtful if more than an occasional carload of white pine (*Pinus strobus*) ever reaches Great Britain from the United States. The smaller quantity available for export and its greater distance from the seaboard has made it impossible for the American product to compete with the Canadian, which enjoys a virtual monopoly in the British market. (For details regarding Canadian pine, see the section under that heading.)

WESTERN PINE

Two varieties of western pine are imported into the United Kingdom—western white pine (*Pinus monticola*) and California white pine (*Pinus ponderosa*).

Western white pine is imported chiefly as rough lumber and squares from both the United States and British Columbia and sold as western pine. It is used principally in place of east Canadian white pine for high-class millwork and finish and for textile machine parts.

During the past few years it has also been imported in the form of timber sawn on all four sides with a heavy wane on each corner and marketed under the name of "western wany pine," in place of the more expensive east Canadian "wany" pine. It is usually imported 18 inches deep, and up, 16 feet long, and up, to average 24 feet or better. This wany timber is used mostly for pattern making, being sawn into such thicknesses as required, and as the result of much work and effort on the part of importers in the shipbuilding centers its use for this purpose is steadily growing. In addition to pattern making, it is occasionally cut into ship decking, but very little has been used so far for this purpose.

The principal market for California white pine is in Scotland, where its attractive price has made it a serious competitor of Canadian white pine for many classes of millwork and finish particularly in the Clyde shipyards. It is chiefly imported in rough lumber, 1¼, 1½, and 2 inches thick, and thin dressed panel stock, while ⅞ by 12 inch, planed two sides, is in growing demand for shelving.

SUGAR PINE

Only small quantities of California sugar pine are used in the United Kingdom, its high cost restricting its use to special purposes where price is a secondary consideration.

Its chief market is also in Scotland, thin, dressed stock for paneling being mostly in demand.

Some is also used for pattern making, but only thicker stock has been found suitable, it being claimed that patterns made of thin lumber show an inclination to buckle.

PORT ORFORD CEDAR

The fine grain and ease with which it can be worked, together with the smooth finish obtainable, has made Port Orford cedar, a popular wood in the United Kingdom. Unfortunately its cost, compared with other species, restricts its use to high-class work and, for that reason, the quantity imported is only of small proportions. The British market takes principally No. 2 clear and better stock, the usual specifications bought being 2 to 4 inches thick by 6 inches and wider, 6 feet long, and up, also, particularly in Scotland, 1¼ and 1½ inches are favorite thicknesses.

Liverpool and Glasgow are the chief consuming centers for Port Orford cedar, it being used largely in the shipyards of those districts for millwork and interior finish on passenger vessels, one yard in particular using it almost exclusively for the stiles and rails of cabin doors. There is also a small quantity used for the manufacture of battery separators, but it is difficult for them to compete with the ready-made imported article. Some Port Orford cedar has also been used with complete satisfaction for decking purposes on yachts, and there would seem to be opportunities for developing this trade (although the field is a somewhat limited one) provided the merits and suitability of this species were brought to the attention of the yacht builders in this country, to many of whom it is a comparatively unknown wood.

In larger vessels also there appears to be a field for Port Orford cedar for decking purposes. Several years ago in one of the foremost British shipyards an experimental deck was laid down which so far has stood wear in a most satisfactory manner. The principal handicap against a greater use of this species, however, for decking is the short lengths usually furnished this market, and if these could be increased to, say, an average of 20 to 21 feet in 2½ and 3 by 5 inch dimensions, according to a prominent Glasgow importer who caters largely to the Clyde shipbuilding industry, the conditions are favorable for its use being extended for this particular purpose.

CALIFORNIA REDWOOD

California redwood, or Sequoia as it is sometimes called, has been irregularly imported for many years into the United Kingdom, but its use has not increased to the extent that its nature and characteristics deserve. Prior to the opening of the Panama Canal it was generally imported in full cargo lots by sailing vessels. Owing to the large quantity necessary to fill one of these, the import trade in this species was restricted to a very few firms who specialized in it, but the total quantity brought into the country was never very large.

Until recently only heavy planks were imported, a usual specification calling for 3 to 6 inches by 12 inches and wider, 10 to 20 feet long. The stock being shipped green, it took many months in the British climate for the lumber to become sufficiently dry to be used, which tied up a considerable amount of capital for a long period. As a consequence of these factors, importers made little effort to push its sale, merely keeping sufficient stock on hand to meet any call for it, so that at the present time its use has fallen to insignificant proportions.

California redwood was formerly used for high-class panelwork in railroad passenger cars and steamships, store fittings, and signboards, but little is used for these purposes now, it having been replaced by other species. However, during the past few years efforts have been made by American exporters to reintroduce this species into the British market through offering small parcel lots, now possible by the opening of the Panama Canal and the shipment of kiln-dried stock in smaller dimensions such as are sold to other foreign markets, which naturally can be furnished much cheaper than the large sizes.

So far these efforts have met with little success; although a few sample shipments were made they have largely remained on the importers' hands.

It is unfortunate that to many engaged in the lumber trade in the United Kingdom redwood is always associated with stock of very large dimensions, such as was sold in the past, which adds to the difficulty of selling smaller sizes, and to-day the moderate demand is almost exclusively for large planks, which enables the dealer to fill any inquiry called for.

Whether the market for California redwood can be developed is open to question. Other woods suitable for the purposes for which it might be used are obtainable at much lower prices, and it is doubtful if there is much opportunity of its being employed for interior finish, the purpose for which it is so greatly used in the United States, except in competition with the inexpensive north European softwoods.

Many of the uses to which redwood is put in America, such as pipe lines and silos, do not exist in the United Kingdom, and even with the wider field in the United States it has taken many years of effort and extensive advertising to develop a market which, except for those purposes already mentioned, has been largely along specialty lines. If these efforts were necessary in this country, it can be realized that in the highly competitive and also conservative British market little progress can be hoped for unless considerable work is done to bring the particular merits of California redwood to the attention of the general public, who are the ultimate consumers.

Naturally British lumber agents can not be expected to pay the cost of advertising or other methods employed. If American exporters, therefore, deem it worth while to make an effort to increase their sales in this market it will be necessary for them to bear most of the cost.

CYPRESS

The United Kingdom is the second most important foreign market for American cypress, being exceeded only by Canada. Although its special qualities are well known, the demand has remained stationary for several years and is considerably less than pre-war. During 1926 exports of cypress lumber from the United States to the United Kingdom amounted to 1,418,000 feet board measure, valued at $102,372, as compared with 3,305,000 feet, valued at $116,350, in 1913. While exports to the Irish Free State are included in the latter figures and not in those for 1926, the quantity is insufficient to make any appreciable difference.

The high value of cypress to-day in Great Britain limits its use to purposes where a wood of its peculiar qualities is desired, but these are few and offer little opportunity for expansion. In some fields, also, especially the automobile, where formerly large quantities of cypress were used for running boards, metal has been substituted and the volume used for that purpose is comparatively small compared with former years.

On account of its resistance to rot, particularly where subjected to alternating wetness and dryness combined with heat—elements which hasten decay in most species—and also its mild texture, making it easy to work, cypress is still without a rival for purposes where these conditions prevail. For these reasons, it is principally used for the construction of greenhouses, vats and tanks, and facia on stores. The textile industries, especially the linen mills of Northern Ireland, use cypress in preference to any other wood for the construction of troughs, but find it somewhat difficult to get the special lengths in the widths required.

The red variety of cypress is used almost exclusively, most importers specifying for it in their contracts. Prime quality is most in demand, 1, 1¼, and 1½ inches thick, with occasionally a little 2-inch, in widths 6 inches and wider, but more often orders call for widths of 13 to 17 inches, or 18 inches and wider, these specifications being preferred by the consuming industries.

WEST COAST HEMLOCK

While some experimental parcels of west coast hemlock lumber have been imported, it has made little progress in the United Kingdom. Although the beautiful effects obtainable by staining it in various colors have caused it to be included on several occasions in the plans of one of Britain's leading architects for panelwork, it can not be said that much progress has been made in this direction, and in any event the quantity used in this manner never could amount to very much. The fact that it is shipped green and must be piled on sticks for several months before it is dry enough for interior finish and millwork—the most likely outlets—places it at a great disadvantage with other species which can be used immediately or shortly after arrival. The name "hemlock" is also a great handicap, as it conjures up in the mind of the average British lumber dealer a picture of eastern hemlock (which was considered suitable for only the very roughest work in pre-war days), imports of which have now dwindled to practically nil. If, therefore, the demand for west coast hemlock is to make any progress at all it must be shipped dry and the difference between it and the eastern variety clearly brought to the attention of the consuming industries.

There may, however, be a possibility of developing a demand for floor blocks made out of these species, to be sold to those who desire a floor of medium-hard yet inexpensive wood. But in order to interest any possible customers it will be necessary for sample blocks to be furnished for their inspection. Full details as to the sizes and patterns of floor blocks used in the British market are covered in the section on "Floor blocks."

CANADIAN AND WEST VIRGINIA SPRUCE

Canadian spruce.—The importation of Canadian spruce into the United Kingdom is largely confined to the west coast of Great Britain and Ireland, partly owing to the lower freight rates for Baltic woods to east coast ports, where there exists some prejudice in favor of European productions.

For sales purposes Canadian spruce is divided into three groups in the British market: (1) Quebec, (2) Campbellton or equal, and (3) lower port. Of these, stock from Quebec is most expensive and is used largely for special purposes; but, owing to the timber having been largely cut out, imports have been getting less for many years and have now reached very small proportions. Imports are generally in unsorted quality (fourths and better) 3 by 4 inches to 9 inches wide, with a very little 3 by 10 and 11 inches. The lengths are short, running from 10 to 16 feet, with about 70 per cent or more 12 and 13 feet. During the summer of 1927 the approximate market value of that stock for an average specification was £22 for 9-inch and £17 for 6 to 8 inch per standard of 1,980 feet board measure, c. i. f., west coast United Kingdom, east coast Ireland ports. At the same time the ocean freight rate was about 70s. per standard.

One of the most important uses for Quebec spruce is for the manufacture of oars for racing shells and river rowboats, while the bulk of the scaffold boards used by the high-class builders and contractors are of this wood and are made by resawing 3 by 9 inch (in lengths of 12 and 13 feet) into 1½ by 9 inch.

The piano industry also uses Quebec spruce, usually 6 to 8 inches for backing, but it meets strong competition from Archangel spruce or whitewood, which is generally preferred.

Another outlet for Quebec spruce is for high-class packing cases, particularly for heavy material, but its cost has caused it to be discontinued, except for special purposes.

Shipments from the Campbellton district, while not considered equal to those from the Province of Quebec, are preferred to those from the lower ports and are generally designated by the port of shipment, the chief of which are Campbellton, Restigouche, Dalhousie, and Miramichi.

It is imported in unsorted third quality and better, and an average specification from these ports will run about 50 per cent 7 inches and wider (of which 70 per cent will be 7 and 8 inch), and 50 per cent 6 inches and under, chiefly 3 inches thick, 10 feet long and up, average 14 to 14½ feet, and a few 6 to 9 foot ends. Sales are usually made on an overhead price which, during the summer of 1927, was approximately £16 per standard, c. i. f., with ends at two-thirds price, the ocean freight rate being about 65s. per standard.

This stock is used principally for house construction and the better class of packing cases.

Lower port spruce averages only 13 to 13½ feet and is of narrower specification than the preceding classes. It is shipped from Halifax, Parrsboro, Pictou, Pugwash (Nova Scotia), and St. John (New Brunswick), and is largely produced by small portable mills, whose lumber is not so well manufactured as that shipped from other districts. The market price for cargo lots during 1927 was about £14 10s. c. i. f., with 3 to 6 inch widths at £1 less. There is, however, some stock called "St. John city cut" which is much superior in quality, manufacture, and lengths to other lower port shipments, and brings about £1 per standard more. Lower port lumber is used principally for house construction and packing cases.

West Virginia spruce.—There is a small market for prime quality West Virginia spruce, its high value limiting its use to special purposes. It is imported in 1, 2, and 3 inches thick by 6, 8, 10, and 12 inches wide, in lengths of 10 to 20 feet. The principal outlets for this wood are for the manufacture of oars and sculls of racing shells and river boats and for use in the piano industry.

CANADIAN PINE

Both white and red pine are imported from Canada, but the former is by far the most important. Canadian white pine (*Pinus strobus*) is known in the British market as yellow pine, the prefix Canadian, Quebec, or Ottawa sometimes being added. It has been a favorite wood for many years, but since the war its use has been supplanted to a large extent by less expensive varieties, so that imports have decreased. Practically all of it is loaded at Quebec and Montreal and enters the United Kingdom chiefly through Liverpool, London, and Glasgow.

Specifications.—The principal items imported are deals, sidings, or boards, and ends in the following grades and sizes:

Deals.—3 by 12 inches and wider, 3 by 11 inches, 3 by 7 to 10 inches, 3 by 4 to 6 inches in first, second, third, and fourth qualities.

Sidings.—2, 1½, 1¼, and 1 inch, chiefly the latter, by 4 inches and wider in first, second, and unsorted quality. These are frequently sold to width for particular purposes, 12 inch being much in demand for shelving.

Ends.—Ends are usually divided into two specifications of lengths—6 to 10 feet and 3 to 5 feet. The deal sizes are sorted and sold on grade, while the shorter stock is generally shipped 3 by 4 inches and wider, chiefly in first quality.

In addition to the grades mentioned above some Canadian exporters put up special grades of their own which are well known to the trade. The usual lengths for deals and sidings are 10 to 16 feet, although 9 feet are sometimes included, while ends are 3 to 8 or 9 feet, as the case may be.

Prices.—During the summer of 1927 the approximate market value c. i. f. United Kingdom on the principal items were as follows:

Deals.—3 by 12 inches and up, first quality £95, second quality £57, third quality £34; 3 by 11 inches, first quality £90, second quality £54, third quality £32, fourth quality £20 10s.; 3 by 7 to 10 inches, first quality £63, second quality £38, third quality £23, fourth quality £19 10s.

Siding.—1 by 7 inches and up (averaging 8½ inches), first quality £52, second quality £39; 1 by 4 inches and up (averaging 6½ inches), first quality £37.

Ends.—6 to 9 inches, approximate reduction under deal price; 11 inches, first quality £12, second quality £8; 7 to 10 inches, first quality £6, second quality £5; 3 to 5 feet, 3 by 4 inches and wider first quality £47 over all.

There were, however, considerable variations in the different shippers' quotations, and the above prices should not be taken except as approximate 1927 values; they are given for comparative purposes only and do not pretend to be exact.

Principal uses.—Canadian "yellow" or white pine is characterized by its extreme softness, ease of working, lightness in weight, and freedom from resin, but most of all for its ability to stay put without either shrinking or swelling, which has made it preeminent as a pattern-making wood, and it is for this purpose that it is chiefly used in the United Kingdom. In addition to the British Admirality, who annually purchase substantial quantities, the shipbuilding, engineering, and railroad industries are the principal consumers, the quality of lumber used being determined largely by the size of the pattern required. When specially large patterns are required the lumber is cut from "wany" pine logs.

In addition to pattern making it is used for interior finish on high-class ships, fine woodwork in textile machinery, flour mills, where an odorless wood is required, interior finish of high-class residences, mantlepieces, drawing boards and other artists' supplies, organ building, furniture cores for expensive veneers, and small fancy boxes for trinkets.

Formerly there was a considerable demand for the lower qualities from the furniture industry, for use in drawer bottoms, but it has largely been replaced by inexpensive European plywood, chiefly alder.

Wany logs.—There is also imported a very small number of what are known in the trade as "prime wany" logs. These consist of peeled logs that have been hewn on all four sides, leaving a heavy wane on each corner. A usual specification runs from 15 to 24 inches deep and from 15 to 36 feet, mostly 12 to 24 feet in length. The market price for this timber during the summer of 1927 ranged from 8 to 9 shillings per cubic foot, c. i. f., according to specification. Before the war Canadian white pine was extensively used for the promenade decks of high-class passenger vessels, excursion steamers, and yachts, and this decking was cut in the United Kingdom from wany logs, into the required dimensions. However, price has for some years been largely the determining factor of the kind of wood used for this purpose except for vessels trading in the Far East, where teak is still necessary and white pine has been largely discarded. There are some exceptions, however—namely, for excursion steamers of large passenger capacity engaged in short trips. These vessels are usually of light draft so that the weight of the decking makes a difference in their carrying capacity and, for this reason, white-pine decking is still sometimes used, but its high cost prohibits its use except under very special circumstances.

For ordinary purposes, however, wany pine logs are too expensive and their use has been largely replaced by western white pine (*Pinus monticola*) or western wany pine, as it is called in the United Kingdom.

Red pine.—Small quantities of red pine (*Pinus resinosa*) or Norway pine lumber are also received from eastern Canada. It is a hard resinous wood containing considerable knots and is principally used for millwork, particularly window frames and other exposed parts of buildings.

BALSA

Although little known in the United Kingdom, small quantities of balsa have been imported from British Honduras and other Central American countries, and efforts are being made to develop a market for it.

Balsa is a most unusual wood, almost white in color and extraordinarily light in weight, being approximately one-half that of cork.

During the war it was largely used in the United States for life rafts and floats for submarine nets, first being waterproofed by a process of forcing wax into the pores under pressure.

With the end of the war the demand for these purposes ceased and efforts were made to discover uses for which its peculiar properties make it particularly suitable. As a result of these investigations, balsa is now being used for lining telephone boxes and refrigerators, for which purposes its insulating qualities make it especially adaptable.

SIBERIAN PINE—KEDAR

In addition to the shipments from the so-called Kara Sea district of Siberia, which has been referred to in the section on north European softwood, some pine or kedar is received from the maritime territory of Manchuria. This is usually shipped from Vladivostok and is sold in the United Kingdom as Siberian pine. The imports, however, are very intermittent and consist of not more than two or three cargoes of 1,000,000 to 1,500,000 feet board measure each a year.

A cargo which arrived during the early part of 1927 consisted of about 80 per cent lumber 1 to 3½ inches thick by 7 to 24 inches wide, with 90 per cent 9 inches and wider, 9 to 24 feet long, averaging 17 feet or better. This stock was sorted into crown, prime, A, B, and C qualities, all of which were guaranteed free of centers. The remainder of the cargo was made up of 15 per cent 3 by 9 inches and wider center planks, averaging 13 to 14 inches in width and 19 feet in length, and 5 per cent squares 6 by 6 inches, 5½ by 5½ inches, and 5 by 5 inches, and scantlings 4 by 5, 3 by 5, and 3 by 4½ inches.

The wood was well manufactured, in excellent condition, bright, contained few knots, and altogether presented an excellent appearance. It is very similar to Canadian white pine, both in color and in texture, and is used for the same purposes.

HARDWOODS

OAK

From earliest times oak has been vitally connected with the history of England, and it is probable that King Alfred, who established the British Navy in the ninth century, used this wood for his warships. The "wooden walls" of England, built of native oak, were for many hundred years its first line of defense.

Not only for warships, however, was oak used in the early days of English history, for the ancient cathedrals of the country contain many beautiful examples of its suitability for carving, and the remarkable state of preservation of these carvings and furniture testify to its durability. Even to-day the new cathedral being built at Liverpool at a cost of several million pounds sterling is furnished throughout with oak.

The great inroads made for warships greatly depleted the stands of native oak, so that to-day only a small fraction of the demand can be met from this source.

For more humble and utilitarian purposes oak as a popular wood is without a rival in the United Kingdom. The beauty of its grain, whether plain or quarter-sawn, its strength, and wearing qualities make it desirable for many purposes. Of the total hardwood imports during 1925 about 28 per cent were of oak.

As a furniture wood oak takes first place, and while other species come into public favor for a time oak eventually regains its supremacy. This wood, if properly selected, is particularly adapted to panelwork, and a great many oak billets are imported from the Continent of Europe so that the panels of expensive furniture can be matched. It is also used for interior finish of houses, church furnishing, railway equipment, office furniture, and caskets.

SOURCES OF SUPPLY

Except for small quantities of native stock, all the oak used in the United Kingdom is imported, the principal country furnishing it being the United States, followed by Poland, Japan, Italy, Yugoslavia (Slavonian), and Russia in the order named, but of the total imports America supplied approximately 75 per cent during 1925, principally lumber. The following table shows the imports of oak into the United Kingdom, by countries, for the year 1925:

Country	Round and hewn timber		Sawn lumber		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Cubic feet		*Cubic feet*		*Cubic feet*	
United States	52, 943	£12, 358	7, 592, 375	£1, 848, 293	7, 645, 318	£1, 860, 651
Poland (including Danzig)	596, 509	106, 670	660, 352	131, 649	1, 256, 861	238, 319
Japan	51, 698	12, 905	529, 160	211, 715	580, 858	224, 620
Italy	8, 673	4, 939	215, 079	114, 241	223, 752	119, 180
Yugoslavia			103, 209	54, 777	103, 209	54, 777
Russia	55, 537	12, 219	34, 993	8, 525	90, 530	20, 744
Latvia	58, 883	19, 708			58, 883	19, 708
Irish Free State	44, 346	3, 886	31, 032	4, 626	75, 378	8. 512
Canada	17, 298	6, 272	2, 448	355	19, 746	6, 627
Other	9, 552	2, 611	135, 792	45, 007	145, 344	47, 618
Total	895, 439	181, 568	9, 304, 440	2, 419, 188	10, 199, 879	2, 600, 756

UNITED STATES

For many years American oak has been sold, largely in the form of lumber, in the United Kingdom. Various shippers' marks have become well established, and a reputation for reliability of quality and condition has been gained with the consumers in this country. Other factors in its favor are that American exporters are able to give a good specification (especially as regards lengths), that it can be bought in sorted qualities graded under recognized rules, in seasoned condition, and that delivery can usually be relied upon within the time stipulated in the contract.

American oak is sold in the United Kingdom either as "northern" or "southern," the northern variety being understood to embrace lumber manufactured from timber grown in the region of Virginia, North Carolina, West Virginia, Kentucky, Ohio, Indiana, and eastern Tennessee. Preference is given to the northern stock by the smaller furniture manufacturers because most of their work is turned out by hand, and this variety of oak is more easily worked, being of a milder texture than the southern variety; its price is usually $20 to $25 per 1,000 superficial feet more for a good grade. The larger furniture manufacturers are the principal buyers of southern oak because their factories are equipped with machinery, and texture, from the standpoint of workability, is not of vital importance, while the cheaper price is a decided advantage.

Lumber.—Both red and white oak is sold in the United Kingdom, but the majority is white. The red is used primarily in cheap furniture for backing and drawer sides and parts not generally exposed to view. It is also used for furniture having a dark or mission finish.

In normal times all thicknesses and grades of No. 2 common and better find a ready sale, although the largest demand is for No. 1 common and selects plain and quartered stock. It must not be overlooked, however, that American oak meets with severe competition, and when its price reaches a certain level importers look to the Continent of Europe, particularly Poland, for its supplies.

The principal consuming industries of oak lumber are the furniture, house building (for interior trim), railway equipment, and shipbuilding (for saloon and cabin fittings), but of these furniture is by far the largest.

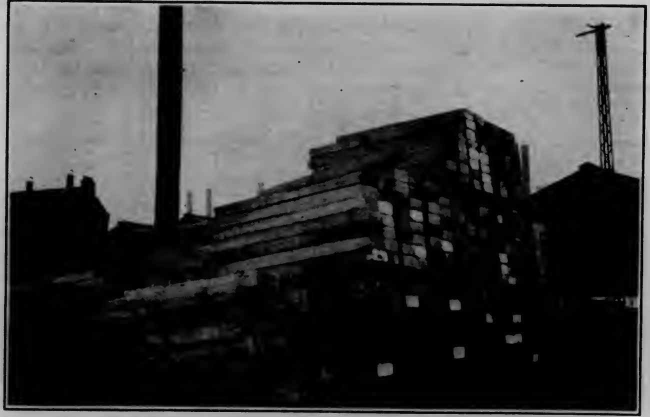


FIG. 12.—American "wagon" oak planks at Scottish car building plant

Wagon, sill, or cabinet planks.—The northern variety of oak is usually called for in this market for its requirements of railway wagon and "cill" or cabinet oak planks. Wagon oak planks are imported mostly through the ports of Liverpool, Glasgow, and Cardiff, and are used principally by manufacturers of railway equipment in the Midlands, South Wales, and Glasgow districts. The usual specifications called for are 5 by 12 inches, principally 16 feet long, with some 8 feet, 12 feet 8 inches, 14½ feet, 15 feet, and 15½ feet; 5½ by 12 inches, 8 and 16 feet; 3½ and 4 by 12 inches, 10 to 16 feet; 3 by 12 inches, 12 to 16 feet; 4 by 5½ inches, 16½ feet rails.

In addition, planks 5½ by 12 inches, 8 feet 3 inches, known as "headstocks," are used by the car builders, but they are able to fill most of their requirements out of English oak at prices American can not compete with. The principal demand from America is for sole bars 5 and 5½ by 12 inches, 16 and 17 feet.

The names "cill" or "cabinet" are used to designate the same stock, depending upon the section of the country from which the inquiry originates. They have, however, become indicative of a quality rather than the use to which the stock is put. Most of these planks are used by furniture manufacturers, while a small quantity is used for window sills, mantels, and doorsteps. The usual specifications called for are 2½, 3, and 4, by 8 inches and wider, 8 to 16 feet. Both wagon and sill planks are shipped green to avoid face checks developing. Large, open checks are strongly objected to by British buyers, and it is suggested that it would be preferable if the stock were cut during the late autumn and winter months so that it dries out before the hot weather.

Coffin oak.—The high-class casket trade prefers oak and purchases from America what is known as "coffin oak boards." This stock may be either red or white, but the latter is greatly preferred and commands a considerable premium over the red. The specifications are usually 12 inches and wider with a percentage of 17 inches and wider, 12 feet and longer, a small percentage of 12 feet allowed, in thicknesses of ⅝, ¾, and 1 inch.

Dimension.—The market for oak squares is also of importance, their importation having increased during recent years, owing to the advance in the cost of raw material, freight, and other charges, also labor for converting lumber into the sizes required. The principal difficulty in extending this business is the liability of the stock to warp, twist, and shrink, if not shipped in perfect condition, and such defective pieces become valueless. It is essential that dimension stock arrive full to size, as even ¼ inch scant would make it a reject. It is believed that if care be taken to meet these requirements, America's exports of oak dimensions to the United Kingdom can be materially increased. This stock is used principally for turning table and chair legs and for decorative pieces of furniture.

Flooring.—The market for American oak flooring is fully covered in the section on "Flooring."

POLAND (INCLUDING DANZIG)

Ranking next to the United States in importance as a source of supply for oak is Poland. This oak varies greatly in texture according to the district from which it is shipped. Some is very mild, while other is so hard as to be called "stone" oak. Polish oak is often sold in the United Kingdom as "Volhynian," after the Province of that name. This species is said to furnish the best texture. Even the best, however, does not compare with the Slavonian (Yugoslavian) in the opinion of the United Kingdom trade. So far many of the Polish exporters can not be relied on to fill their contracts within any definite time, but these are gradually being eliminated. Imports are steadily increasing, and with improvement in manufacture and grading and with greater reliability of shippers, Polish oak appears likely to become a serious competitor of the American product. It is imported in the form of round logs, hewn timber, square-edged lumber, unedged (wany) lumber, flooring strips, squares, and plancons. These latter are logs, hewn on all four faces, with a wide wane left on. They are bought principally by the railroad companies for conversion in their own shops and by the furniture factories. The usual specification is 15 feet long, and up, 15 by 15 inches, and up. Square-edge lumber is not shipped in any large quantity because No. 1 common and selects from America is equally suitable for the

Lumber.—Both red and white oak is sold in the United Kingdom, but the majority is white. The red is used primarily in cheap furniture for backing and drawer sides and parts not generally exposed to view. It is also used for furniture having a dark or mission finish.

In normal times all thicknesses and grades of No. 2 common and better find a ready sale, although the largest demand is for No. 1 common and selects plain and quartered stock. It must not be overlooked, however, that American oak meets with severe competition, and when its price reaches a certain level importers look to the Continent of Europe, particularly Poland, for its supplies.

The principal consuming industries of oak lumber are the furniture, house building (for interior trim), railway equipment, and shipbuilding (for saloon and cabin fittings), but of these furniture is by far the largest.

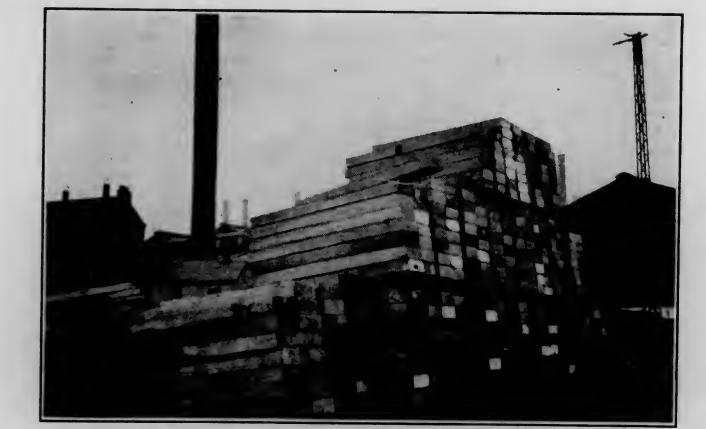


FIG. 12.—American "wagon" oak planks at Scottish car building plant

Wagon, sill, or cabinet planks.—The northern variety of oak is usually called for in this market for its requirements of railway wagon and "cill" or cabinet oak planks. Wagon oak planks are imported mostly through the ports of Liverpool, Glasgow, and Cardiff, and are used principally by manufacturers of railway equipment in the Midlands, South Wales, and Glasgow districts. The usual specifications called for are 5 by 12 inches, principally 16 feet long, with some 8 feet, 12 feet 8 inches, 14½ feet, 15 feet, and 15½ feet; 5½ by 12 inches, 8 and 16 feet; 3½ and 4 by 12 inches, 10 to 16 feet; 3 by 12 inches, 12 to 16 feet; 4 by 5½ inches, 16½ feet rails.

In addition, planks 5½ by 12 inches, 8 feet 3 inches, known as "headstocks," are used by the car builders, but they are able to fill most of their requirements out of English oak at prices American can not compete with. The principal demand from America is for sole bars 5 and 5½ by 12 inches, 16 and 17 feet.

The names "cill" or "cabinet" are used to designate the same stock, depending upon the section of the country from which the inquiry originates. They have, however, become indicative of a quality rather than the use to which the stock is put. Most of these planks are used by furniture manufacturers, while a small quantity is used for window sills, mantels, and doorsteps. The usual specifications called for are 2½, 3, and 4, by 8 inches and wider, 8 to 16 feet. Both wagon and sill planks are shipped green to avoid face checks developing. Large, open checks are strongly objected to by British buyers, and it is suggested that it would be preferable if the stock were cut during the late autumn and winter months so that it dries out before the hot weather.

Coffin oak.—The high-class casket trade prefers oak and purchases from America what is known as "coffin oak boards." This stock may be either red or white, but the latter is greatly preferred and commands a considerable premium over the red. The specifications are usually 12 inches and wider with a percentage of 17 inches and wider, 12 feet and longer, a small percentage of 12 feet allowed, in thicknesses of ⅝, ¾, and 1 inch.

Dimension.—The market for oak squares is also of importance, their importation having increased during recent years, owing to the advance in the cost of raw material, freight, and other charges, also labor for converting lumber into the sizes required. The principal difficulty in extending this business is the liability of the stock to warp, twist, and shrink, if not shipped in perfect condition, and such defective pieces become valueless. It is essential that dimension stock arrive full to size, as even ¼ inch scant would make it a reject. It is believed that if care be taken to meet these requirements, America's exports of oak dimensions to the United Kingdom can be materially increased. This stock is used principally for turning table and chair legs and for decorative pieces of furniture.

Flooring.—The market for American oak flooring is fully covered in the section on "Flooring."

POLAND (INCLUDING DANZIG)

Ranking next to the United States in importance as a source of supply for oak is Poland. This oak varies greatly in texture according to the district from which it is shipped. Some is very mild, while other is so hard as to be called "stone" oak. Polish oak is often sold in the United Kingdom as "Volhynian," after the Province of that name. This species is said to furnish the best texture. Even the best, however, does not compare with the Slavonian (Yugoslavian) in the opinion of the United Kingdom trade. So far many of the Polish exporters can not be relied on to fill their contracts within any definite time, but these are gradually being eliminated. Imports are steadily increasing, and with improvement in manufacture and grading and with greater reliability of shippers, Polish oak appears likely to become a serious competitor of the American product. It is imported in the form of round logs, hewn timber, square-edged lumber, unedged (wany) lumber, flooring strips, squares, and plancons. These latter are logs, hewn on all four faces, with a wide wane left on. They are bought principally by the railroad companies for conversion in their own shops and by the furniture factories. The usual specification is 15 feet long, and up, 15 by 15 inches, and up. Square-edge lumber is not shipped in any large quantity because No. 1 common and selects from America is equally suitable for the purposes for which the Polish stock is required, and is not only cheaper, but the supply is more reliable.

The principal demand is for unedged lumber, which is manufactured by sawing the log through and through without squaring first. The great advantage to the United Kingdom importers in buying this stock is that a very wide average width is obtainable and 13 inches is not unusual. This stock is sold at the present time for less than No. 2 common plain white oak from the United States. Furniture manufacturers almost exclusively buy this stock, largely for the cheaper kinds of chairs. It is sold ¾ inch and thicker, chiefly 2½ inches and thicker. Generally speaking Polish oak is not suitable for cutting into less than 1¼ inches in thickness. The boards are measured in the middle of the piece, including one-half the wane. Flooring strips are not imported in any quantity, owing to the opposition from the British workmen, who find difficulty in planing the floor to get the necessary smooth finish after it has been laid. It is thought, however, that this business will improve, as Polish shippers are prepared to sell 1 and 1¼ by 4 inches, 6 feet and longer, the sizes most used in this market, and are selecting their oak from the best districts for texture. Wagon oak planks for railroad freight-car building are also supplied by Poland, and only lack of supplies prevents their greater use.

JAPAN

Japanese oak is much favored by British architects, and for the past few years they have been calling for it for panelwork in their plans for high-class buildings and residences. It is imported in the form of square-edge lumber, in all thicknesses from ½ to 4 inches, both plain and quartered, squares, flooring strips, and hewn timber. Imports are steadily increasing, the demand being principally for prime and second or three-star qualities of lumber and strips. The texture of Japanese oak is mild and uniform, but lacks toughness, and for this reason is not suitable for purposes where strength is required. The lumber is shipped on grade, but as the trees from which it is manufactured do not grow to any great height, only short lengths can be furnished. Its principal uses are for furniture and panelwork.

YUGOSLAVIA

Slavonian oak is a prime favorite in the United Kingdom and is used entirely for high-class work. Prior to the war, it was shipped from territory within the Austro-Hungarian Empire. By the Treaty of Versailles, however, that territory was allotted to Yugoslavia, but the old name is still used. Oak from the Austrian hinterland, now part of Italy, is also sold in this market as Slavonian, but strictly speaking only the oak originating in Yugoslavia can properly be called Slavonian. The principal shipping ports for this stock are Fiume and Trieste, both of which are now in Italy, which accounts for that country's being erroneously credited in British statistics as the country of origin.

The texture of this variety of oak is exceedingly mild. It is rich and uniform in color and practically free from sap. It is easily worked, and for that reason is greatly desired by cabinetmakers specializing in expensive handmade furniture, and brings the highest price of any oak sold in the United Kingdom.

Slavonian oak is used chiefly for what is called wainscot or panelwork in residences, railroad carriages, furniture, high-class passenger vessels, and, to a lesser extent, for veneers. It is usually shipped several years dry, and British importers often obtain four to five years' seasoning before shipment. This wainscot oak is shipped in the form of billets, either uncut or sawn through and through, and wired so as to arrive at its destination intact. When this is done it is called a cut billet. Billets are made by cutting the center out of the log, and cutting off the sides of the cant until an 8-inch face is obtained. These center pieces are sold as center-heart planks and measure 3 inches thick by the full width of the log. The result is an irregular piece of timber, sawn on three faces with the bark left on the other. The center of this piece is called the "crown" and is desired as wide as possible. The term "wainscot" applied to oak referred originally to the form in which the logs were shipped from the Baltic, with two sides hewn flat to take up less room in the ship's hold.

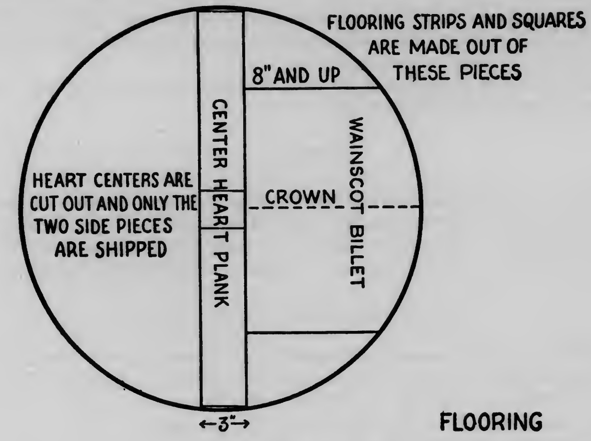

FLOORING STRIPS AND SQUARES ARE MADE OUT OF THESE PIECES
8" AND UP
CENTER HEART PLANK
WAINSCOT BILLET
CROWN
HEART CENTERS ARE CUT OUT AND ONLY THE TWO SIDE PIECES ARE SHIPPED
←3"→
FLOORING

FIG. 13.—Wainscot billet

The lumber developed in cutting the required 8-inch edge is manufactured into flooring strips and squares. Square-edged lumber, both quartered and plain, is imported in all thicknesses in "prime dry" quality—usually 6 inches and wider, 6 feet long, and up. In addition to these, what are known as "boules" or butt-cut logs sawn through and through to various thicknesses, rebound together, and thoroughly seasoned, are imported. By this means a wide average width and long lengths can be obtained. There are no recognized grading rules for Slavonian oak, and sales transactions are based solely on the reputation of the shipper concerned.

RUSSIA

The oak export trade of Russia is being rapidly reorganized, and fairly large quantities, chiefly logs and uncut wainscot billets, with a little lumber, are now being shipped to the United Kingdom. The

Russian billet differs from the Slavonian in that the log is simply sawn or split through the middle and the center hewn out of each piece instead of a plank being sawn out. By this method the heart center is naturally not so completely eliminated as in the Slavonian billet. In both types the sides are faced to the specification called for, usually 8 inches. Odessa, on the Black Sea, and Riga in Latvia, are the principal ports of shipment. The exports credited to the latter country in British statistics really originate in Russia but are shipped through Latvia for convenience. The Soviet Government controls all exports of lumber and is endeavoring to increase its trade in graded lumber. Already several parcels have been sent to the United Kingdom but because of faulty grading this lumber has not so far met with much success. An effort is being made to rectify this difficulty by employing competent inspectors and seeking advice from London agents as to what can be done to meet this market's requirements.

All sales to the United Kingdom are made through selling agents—Arcos (Ltd.), London—who use the services of various British agency firms to act as their representatives.

Russian oak is considered as of a better texture than the Polish, but not equal to the Slavonian.

RUMANIA

During 1925 Rumania shipped some oak to the United Kingdom, chiefly as square-edged lumber 1 by 6 inches and up, through the port of Galatz. The stock, however, does not compare for texture with Slavonian, and is not an important factor in this market.

NATIVE AND IRISH FREE STATE

Supplies of oak from native and Irish Free State sources are of little importance. Most of it is used for railway equipment, wheelwright material, fencing, and floor blocks, its extreme toughness making it especially desirable for these purposes. There is, however, a brown oak of great beauty which is in demand for furniture and panelwork, and this variety is even exported to the United States at times.

CANADA

Canadian oak, which is all of the white variety, is imported almost entirely in the form of square, hewn timber, and round logs, the quantity of lumber being insignificant. Hewn timber is shipped principally through the port of Quebec, an average specification being 20 to 40 feet long by 20 inches deep in the center of the log. The imports are practically all taken by the railroads for car building, although a small quantity is used for dock construction. The round logs are shipped from 13 to 16 feet in length, as large a diameter as possible being desired. These logs are converted locally into coffin boards, on account of the wide widths that can be obtained, and furniture stock. However, imports of Canadian oak are steadily diminishing and are of little consequence in the British market to-day.

FUTURE OUTLOOK

British imports of oak have shown a steady expansion since the depression that occurred immediately after the postwar boom, increasing from about 3,000,000 cubic feet in 1921 to over 10,000,000 in 1925, the last year for which figures are available. During this period the United States slightly increased its share of the business, with about 75 per cent in 1925 as against 73 per cent in 1921. An important factor in considering the future demand for this species is the great number of houses that have been built in this country with the assistance of subsidies from the Government and municipalities during the past five years, which constitute a large potential outlet for considerable quantities of furniture. Owing to the industrial depression, however, that has prevailed during the greater part of that period, the wage-earning classes have not been in a position to buy furniture in the quantity that they would have done if fully employed. The result is that to-day the majority of their dwellings are but scantily furnished, much worn-out furniture not having been replaced.

It has been publicly stated recently by many of the leading British bankers and industrialists that, provided there is no setback through labor troubles, a new era of prosperity is now commencing in the United Kingdom; and with it an increase in the earnings of the so-called working classes may be anticipated, which should be reflected in a greater demand for furniture and musical instruments, both of which industries use large quantities of hardwoods. As the premier species for furniture making, and to a lesser extent, talking-machine cabinets, oak will doubtless get the largest share of this increased demand. Growing competition, however, may be expected, particularly from Poland and Japan, whose exporters are fully alive to the importance of the British market as an outlet for their product, but the United States has many advantages that it will be difficult to overcome, which have already been mentioned. There is one thing, however, affecting trade with the United States—i. e., the car-building industry, where for the underframes of freight cars American white oak is being largely replaced by the Polish variety and also other species, principally Australian karri and jarrah. The chief reason for this, as stated by a leading British agent, is not on account either of price or preference for the Australian wood, but is almost entirely the difficulty in getting supplies within the time specified in the contract. It is said that it is not unusual for deliveries to be made several months late. As a consequence many car builders are now using other species to an increasing extent, where heretofore only American northern white oak was considered. This business, however, could probably be regained provided that contracts for wagon oak planks were delivered with the same punctuality as other lumber.

In conclusion it may be said that in general the outlook is bright for a continued expansion of oak imports by the United Kingdom, of which America should supply the greater part. Exporters to the British market, however, would be well advised not to become careless regarding the quality, condition, and manufacture of stock shipped, but to continue to exercise the greatest care and so retain the good will of their many British customers.

RED AND SAP GUM

Imports of red and sap gum have remained practically stationary for several years and are considerably below pre-war figures. During 1913 exports of this species from the United States to the United Kingdom amounted to 35,821,000 feet, board measure, while in 1926 they were only 20,184,000 feet. Perhaps more than any other American hardwood the consumption of gum is influenced by its price relation to other species, and when the cost of either red or sap gum rises above an economic level its use is discontinued and less expensive woods are substituted. The proportion of red and sap gum used in this market depends largely upon the spread in price between the two, and when this reaches a certain limit the demand is transferred to the other. In recent years the proportion of sap gum has been steadily growing, largely on account of the appreciation in value of red.

At the present time it is estimated that the British market uses approximately 75 per cent sap and 25 per cent red gum.

Red gum, or satin walnut as it is called in the United Kingdom, is imported both in first and second and No. 1 common and select grades, principally the latter, 1 inch thick being mostly in demand, with a little 1½ and 2 inches. In former years when red gum was cheaper than oak it was extensively used for furniture, but for some time now the position has been reversed. While the average British workman bought "satin walnut" furniture when it was cheaper than oak, the latter is preferred, and just as soon as the price advantage disappeared the demand reverted to oak and has remained so until to-day, so that little red gum is now used for furniture compared with pre-war years. Unlike in the United States, quartered red gum is not used for paneling and interior finish, other species, particularly walnut, being preferred.

Sap gum is sold as hazel pine in Great Britain and is imported in all thicknesses, ⅜ inch and thicker. In first and second quality the demand is principally for ⅝ and 1 inch, while in No. 1 common and select all thicknesses up to 1 inch are taken, but chiefly 1 inch. One inch and under is frequently imported dressed two sides to thickness specified. The widths are usually specified in contracts for sap gum, they being divided in 6 inches and wider, 13 to 17 inches, and 18 inches and wider.

In addition, there is a special market for 1 and 1¼ by 15 to 17 inches "first and second" quality rough lumber for the manufacture of toilet seats, which are stained to resemble mahogany.

The principal use of sap gum is for cheap furniture, coffins, and picture molding. The automobile industry also uses ⅝ by 13 inches and wider for bending purposes. Formerly considerable sap gum was used for electric wire casing, but insurance regulations in most cities now require this to be of metal. Likewise the use of inexpensive plywood has largely replaced ⅜-inch sap gum for drawer bottoms.

Many complaints are made by British buyers on account of shipments of red and sap gum arriving twisted and warped. Such defects are considered serious and are usually made the basis for heavy claims. Another frequent cause of complaint is discoloration to which air-dried sap gum is particularly liable.

There is no sale for heavy discolored sap gum in the United Kingdom, and although sound stain is not considered a defect, according to American grading rules, lumber graded according to those rules is not acceptable to this market. British buyers always stipulate for "reasonably bright" stock in their contracts for sap gum, but as to what constitutes reasonable stain is largely a matter of opinion, and trouble frequently arises on this account. It is therefore advisable that only such stain as can be removed by dressing be permitted in lumber for export, but a brand known to indicate a shipper of strictly "bright" lumber will always receive preference from the British buyer. A considerable proportion of the sap gum now being received is steamed, and although at first there was a good deal of objection to it, this has now been largely overcome and steamed stock has gained popularity in many quarters.

It will be readily understood from the foregoing that the exportation of red and sap gum is a business requiring special care, as the inherent nature of the wood itself makes it particularly susceptible to climatic and atmospheric conditions.

Dangers beset gum from the time it leaves the mill until it is piled in the British buyer's yard, and although it may leave the American mill in perfect condition, improper protection during transit or while on the docks and sweating in vessels may cause it to arrive in such condition as to be unrecognizable as the same lumber. Only American exporters who have realized these conditions and taken steps to meet them have found this business profitable, while others have paid such heavy claims that they have discontinued soliciting orders altogether in the British market.

YELLOW POPLAR

For many years the United Kingdom has been the most important foreign market for American yellow poplar, and during 1926 a total of 23,266,000 feet board measure of lumber, or over 70 per cent of the total exports from the United States, were shipped to that country. In addition there was also shipped a small quantity of round logs, although there has never been a very great demand for them in that market.

Following the boom year of 1919, when 27,246,000 feet board measure of lumber were shipped to the United Kingdom, the demand suffered a severe slump, but by 1926 exports were nearly back to the pre-war level.

Yellow poplar is sold under various names in Great Britain, those of "canary whitewood," "canary wood," and "American whitewood" being used indiscriminately.

Its evenness of grain and mildness of texture make it easy to work, which, together with the wide widths in which it can be obtained, has made yellow poplar exceedingly desirable for many purposes, and it has long been a favorite wood for millwork and interior finish and furniture making in the British market. Its freedom from shrinkage also makes it particularly suitable for panels, counter tops, and other wide-surface work, and the ease with which it can be stained to resemble other woods has also helped its sale.

Both the northern and southern varieties are in demand, and while the former is preferred on account of its softness and mellowness of texture, its high cost somewhat restricts its use, and of late years it has been replaced to a large extent by the less expensive southern variety.

Yellow poplar is imported in all grades, No. 2B common and better, and in all thicknesses, ⅜ inch and thicker, those under 1 inch generally being dressed two sides to the thickness named. Northern stock is principally used for panelwork on passenger steamers, table and counter tops, office, store, and bank partitions and fittings, and high-class furniture, panel and wide No. 1 quality, 18 inches and wider, being particularly favored where wide widths are desired, such as for facia or name boards over shop fronts, panels, and counter tops. The ability to stain yellow poplar to a color resembling mahogany formerly accounted to a large extent for its use for these purposes, but since its cost has risen above that of African mahogany it has largely been abandoned in favor of that species or the less expensive southern variety. The great bulk of American poplar now used in the United Kingdom originates in the Southern States, and while this variety does not have the fine, even texture of the northern stock, and is also more knotty and sappy and does not run to such wide widths, its lower cost compensates for these disadvantages.

Yellow poplar is used principally for automobile bodies, the cheaper kinds of furniture, cabin fittings, and paneling on passenger steamers. No. 1 common and select, dressed two sides to ½ and ⅞ by 10 inches and wider, is mostly called for, the ⅞ inch being in greatest demand. The furniture industry also formerly used large quantities of ⅜-inch No. 2B common for drawer bottoms, but this has been almost entirely supplanted by the cheaper varieties of European plywood. In addition to these outlets, the piano industry takes both northern and southern stock in clear sap grade for use as a core on which veneers of fancy hardwoods are applied.

Logs.—Only a small quantity of yellow poplar logs are used in Great Britain, the majority coming from the Southern States. They are imported peeled and in prime quality, the usual specifications called for being as follows: Widths, 18 inches and up, averaging 21 to 22 inches, 23 to 27 inches, 28 inches and up; all 10 to 16 feet long.

These logs are used for the manufacture of veneers and also for dye rollers employed in textile mills, and are to some extent taking the place of Canadian white pine for that purpose.

MAHOGANY

Mahogany was first imported into the United Kingdom from Jamaica probably about the year 1724, and it was not until over 100 years later that the African variety made its appearance. Chippendale, about the middle of the eighteenth century, who then was at the height of his fame, created a fashion for mahogany chairs and cabinets by means of the beautiful and original designs which he carried out in that species. Other master craftsmen, such as Sheraton and Heppelwhite, whose names are as well known, also used it for their work. Since that time mahogany has been the favorite wood for high-class cabinetwork in Great Britain, though other species have from time to time had a temporary vogue. From many points of view mahogany is to-day the cheapest available species for the better class of furniture and high-class interior finish and fittings. Its use is being furthered by the high cost of competitive hardwoods and is likely to increase in the future.

The mahogany trade of the United Kingdom is divided into two classes—the log (in the United Kingdom the name "log" is used to describe either round logs or sawn or hewn timber), which is in the hands of a few brokers who hold periodical auctions for their sale, and the lumber, handled in the same manner as any other hardwood.

The logs are usually imported in the form of square timber hewn on all four sides. A few found logs are also imported, but they do not find favor for the reason that it is the practice of the public sawmills, where most of the sawing into lumber is done, to base their charges on the deepest cut of the log or stick of timber made by the saw, so that in the case of round logs it would mean that the cost of sawing the narrow side boards would be prohibitive. Another reason is that the trade prefers buying hewn timber, which is sold on sales measure, to buying logs, which are sold on actual contents.

The quantity and value of imports of mahogany timber and logs during the year 1925 are shown in the following table:

Country	Quantity	Value
	Cubic feet	
Nigeria (including British Cameroons)	1,118,872	£281,913
French West Africa	1,032,243	213,000
British Honduras	257,444	141,005
Gold Coast (including British Togoland)	569,887	135,776
France	80,793	21,508
United States	47,572	20,439
Cuba	53,612	13,400
Liberia	10,770	2,907
Nicaragua	1,688	636
All other	83,228	20,285
Total	3,256,109	850,869

SOURCES OF SUPPLY

Africa.—Practically all African mahogany is imported hewn square and is very large, running from 18 to as large as 60 inches in width, taken in center of the stick, and from 10 to 35 feet long, some exceptionally large ones weighing as much as 10 tons.

There are two main kinds of mahogany that come out of West Africa; those species considered by the British trade as genuine mahogany are shipped from Nigeria, French Ivory Coast, and British Gold Coast, and okoumé or Gabon mahogany is shipped from the French Congo. Of these, the Nigerian is the most important, it being preferred on account of its color and even texture, and is sold in the United Kingdom under the general descriptions of Benin and Lagos mahogany, indicative of the districts in which the timber originated rather than the ports from which it is loaded.

The principal ports of shipment for Benin and Lagos mahogany are Benin, Sapele, Abonema, and Degama. A peculiar characteristic of Sapele mahogany is its scent, which is somewhat similar to cedar, and it is harder and heavier than either Benin or Lagos wood.

texture, its high cost somewhat restricts its use, and of late years it has been replaced to a large extent by the less expensive southern variety.

Yellow poplar is imported in all grades, No. 2B common and better, and in all thicknesses, ⅜ inch and thicker, those under 1 inch generally being dressed two sides to the thickness named. Northern stock is principally used for panelwork on passenger steamers, table and counter tops, office, store, and bank partitions and fittings, and high-class furniture, panel and wide No. 1 quality, 18 inches and wider, being particularly favored where wide widths are desired, such as for facia or name boards over shop fronts, panels, and counter tops. The ability to stain yellow poplar to a color resembling mahogany formerly accounted to a large extent for its use for these purposes, but since its cost has risen above that of African mahogany it has largely been abandoned in favor of that species or the less expensive southern variety. The great bulk of American poplar now used in the United Kingdom originates in the Southern States, and while this variety does not have the fine, even texture of the northern stock, and is also more knotty and sappy and does not run to such wide widths, its lower cost compensates for these disadvantages.

Yellow poplar is used principally for automobile bodies, the cheaper kinds of furniture, cabin fittings, and paneling on passenger steamers. No. 1 common and select, dressed two sides to ½ and ⅞ by 10 inches and wider, is mostly called for, the ⅞ inch being in greatest demand. The furniture industry also formerly used large quantities of ¾-inch No. 2B common for drawer bottoms, but this has been almost entirely supplanted by the cheaper varieties of European plywood. In addition to these outlets, the piano industry takes both northern and southern stock in clear sap grade for use as a core on which veneers of fancy hardwoods are applied.

Logs.—Only a small quantity of yellow poplar logs are used in Great Britain, the majority coming from the Southern States. They are imported peeled and in prime quality, the usual specifications called for being as follows: Widths, 18 inches and up, averaging 21 to 22 inches, 23 to 27 inches, 28 inches and up; all 10 to 16 feet long.

These logs are used for the manufacture of veneers and also for dye rollers employed in textile mills, and are to some extent taking the place of Canadian white pine for that purpose.

MAHOGANY

Mahogany was first imported into the United Kingdom from Jamaica probably about the year 1724, and it was not until over 100 years later that the African variety made its appearance. Chippendale, about the middle of the eighteenth century, who then was at the height of his fame, created a fashion for mahogany chairs and cabinets by means of the beautiful and original designs which he carried out in that species. Other master craftsmen, such as Sheraton and Heppelwhite, whose names are as well known, also used it for their work. Since that time mahogany has been the favorite wood for high-class cabinetwork in Great Britain, though other species have from time to time had a temporary vogue. From many points of view mahogany is to-day the cheapest available species for the better class of furniture and high-class interior finish and fittings. Its use is being furthered by the high cost of competitive hardwoods and is likely to increase in the future.

The mahogany trade of the United Kingdom is divided into two classes—the log (in the United Kingdom the name "log" is used to describe either round logs or sawn or hewn timber), which is in the hands of a few brokers who hold periodical auctions for their sale, and the lumber, handled in the same manner as any other hardwood.

The logs are usually imported in the form of square timber hewn on all four sides. A few found logs are also imported, but they do not find favor for the reason that it is the practice of the public sawmills, where most of the sawing into lumber is done, to base their charges on the deepest cut of the log or stick of timber made by the saw, so that in the case of round logs it would mean that the cost of sawing the narrow side boards would be prohibitive. Another reason is that the trade prefers buying hewn timber, which is sold on sales measure, to buying logs, which are sold on actual contents.

The quantity and value of imports of mahogany timber and logs during the year 1925 are shown in the following table:

Country	Quantity	Value
	Cubic feet	
Nigeria (including British Cameroons)	1, 118, 872	£281, 913
French West Africa	1, 032, 243	213, 000
British Honduras	257, 444	141, 005
Gold Coast (including British Togoland)	569, 887	135, 776
France	80, 793	21, 508
United States	47, 572	20, 439
Cuba	53, 612	13, 400
Liberia	10, 770	2, 907
Nicaragua	1, 688	636
All other	83, 228	20, 285
Total	3, 256, 109	850, 869

SOURCES OF SUPPLY

Africa.—Practically all African mahogany is imported hewn square and is very large, running from 18 to as large as 60 inches in width, taken in center of the stick, and from 10 to 35 feet long, some exceptionally large ones weighing as much as 10 tons.

There are two main kinds of mahogany that come out of West Africa; those species considered by the British trade as genuine mahogany are shipped from Nigeria, French Ivory Coast, and British Gold Coast, and okoumé or Gabon mahogany is shipped from the French Congo. Of these, the Nigerian is the most important, it being preferred on account of its color and even texture, and is sold in the United Kingdom under the general descriptions of Benin and Lagos mahogany, indicative of the districts in which the timber originated rather than the ports from which it is loaded.

The principal ports of shipment for Benin and Lagos mahogany are Benin, Sapele, Abonema, and Degama. A peculiar characteristic of Sapele mahogany is its scent, which is somewhat similar to cedar, and it is harder and heavier than either Benin or Lagos wood.

This variety is in great demand for veneer on account of the large percentage of logs which show "stripe" or "ribbon stripe," sometimes called narrow roe. It is a strong favorite in Italy and Germany, and a great deal of it goes to those countries.

Next in importance to the Nigerian mahoganies are those from the French Ivory Coast, which are classed in the same category as those from Benin and Lagos. Grand Bassam is the chief port of loading, other ports being Grand Lahou and Assinie.

Mahogany from the Gold Coast, Liberia, and other territories is usually sold under the general description of "African"; Seccondee, Half Assinie, Accra, and Axim in the first-named territory being the most important ports of shipment.

Timber from Grand Lahou, Seccondee, Assinie, Half Assinie, and Axim is not so reliable as that coming from Nigeria and Grand Bassam, being more faulty and of not so even texture. On the other hand, the higher percentage of figured logs which it contains compensates for its defects.

FIG. 14.—Handling African mahogany at Liverpool docks

Least popular of all is the Accra mahogany, which is hard, heavy, and of variable texture.

Okoumé or Gabon mahogany, as it is called in the United Kingdom, is imported from the French Congo. During 1926 a total of about 6,000 tons of this species was imported. Small quantities of mahogany similar to the other African, known as "Cape Lopez," are also imported from the French Congo.

Central America.—Central American mahogany, which, with the Cuban and San Domingo stock is sometimes called Spanish mahogany because it originally came from the old Spanish Main, comes principally from British Honduras and to some extent from Nicaragua, Mexico (Tabasco), Guatemala, Costa Rica, and Venezuela, either direct or via the United States, but by far the largest part comes from the first-named country. Like the African, it is square hewn with a few round logs, but the sizes run much smaller, ranging from 16 to 40 inches in width (chiefly 16 to 24) in center of piece, and from 10 to 35 feet long. Of these countries, stock from British Honduras is preferred on account of its color and texture.

West Indies.—Cuban mahogany is not only imported direct, but also via the United States, so that British statistics do not show the correct quantity actually coming from that country. It is generally square hewn and runs much smaller than Central American timber—an average specification at the present time (May, 1927) would probably contain about 25 to 30 per cent 9 to 11 inches, 60 to 65 per cent 12 to 15 inches, 5 to 10 per cent 16 inches and up in width in the center of the stick. The lengths also are short, ranging from 6 to 24 feet. Cuban mahogany is the most valuable of all the varieties imported into the British market. It has a rich red color and a hard fine texture which takes a particularly high polish, and some is finely figured.

Next to the Cuban, mahogany from Santo Domingo is preferred on account of its similarity to the Cuban, but only comparatively small quantities are available.

France.—British buyers frequently purchase selected logs from stocks in Havre and Bordeaux which have been shipped direct from the French Ivory Coast and the French Congo. It is these logs that are credited to France in the British customs statistics.

United States.—The imports of mahogany logs from the United States represent logs imported into that country from Cuba and Central America and later shipped to British buyers.

Borneo.—Small quantities of "mahogany" (actually Serayah) are imported from British North Borneo largely in the form of clear sawn squares 4 by 4 inches, 5 by 5 inches, 6 by 6 inches, from 10 to 20 feet long, and lumber. These squares are used chiefly in the textile industries for rollers.

Brazil.—Brazilian mahogany is also imported in small quantities. It is sawn on all four sides with a heavy wane on each edge. It is very hard and brittle and a peculiar feature is the presence of pitch pockets. It does not store well and deteriorates rapidly.

Peru.—Small sample shipments of mahogany have within recent times been received from Peru, but insufficient time has elapsed to allow the trade to arrive at an accurate estimate of its properties and values.

PORTS OF ENTRY

Liverpool.—Liverpool has been the center of the African mahogany trade for over 50 years and about three-quarters of the total imports pass through that city. Most of the Borneo and Brazilian imports also enter through this port.

This variety is in great demand for veneer on account of the large percentage of logs which show "stripe" or "ribbon stripe," sometimes called narrow roe. It is a strong favorite in Italy and Germany, and a great deal of it goes to those countries.

Next in importance to the Nigerian mahoganies are those from the French Ivory Coast, which are classed in the same category as those from Benin and Lagos. Grand Bassam is the chief port of loading, other ports being Grand Lahou and Assinie.

Mahogany from the Gold Coast, Liberia, and other territories is usually sold under the general description of "African"; Seccondee, Half Assinie, Accra, and Axim in the first-named territory being the most important ports of shipment.

Timber from Grand Lahou, Seccondee, Assinie, Half Assinie, and Axim is not so reliable as that coming from Nigeria and Grand Bassam, being more faulty and of not so even texture. On the other hand, the higher percentage of figured logs which it contains compensates for its defects.

FIG. 14.—Handling African mahogany at Liverpool docks

Least popular of all is the Accra mahogany, which is hard, heavy, and of variable texture.

Okoumé or Gabon mahogany, as it is called in the United Kingdom, is imported from the French Congo. During 1926 a total of about 6,000 tons of this species was imported. Small quantities of mahogany similar to the other African, known as "Cape Lopez," are also imported from the French Congo.

Central America.—Central American mahogany, which, with the Cuban and San Domingo stock is sometimes called Spanish mahogany because it originally came from the old Spanish Main, comes principally from British Honduras and to some extent from Nicaragua, Mexico (Tabasco), Guatemala, Costa Rica, and Venezuela, either direct or via the United States, but by far the largest part comes from the first-named country. Like the African, it is square hewn with a few round logs, but the sizes run much smaller, ranging from 16 to 40 inches in width (chiefly 16 to 24) in center of piece, and from 10 to 35 feet long. Of these countries, stock from British Honduras is preferred on account of its color and texture.

West Indies.—Cuban mahogany is not only imported direct, but also via the United States, so that British statistics do not show the correct quantity actually coming from that country. It is generally square hewn and runs much smaller than Central American timber—an average specification at the present time (May, 1927) would probably contain about 25 to 30 per cent 9 to 11 inches, 60 to 65 per cent 12 to 15 inches, 5 to 10 per cent 16 inches and up in width in the center of the stick. The lengths also are short, ranging from 6 to 24 feet. Cuban mahogany is the most valuable of all the varieties imported into the British market. It has a rich red color and a hard fine texture which takes a particularly high polish, and some is finely figured.

Next to the Cuban, mahogany from Santo Domingo is preferred on account of its similarity to the Cuban, but only comparatively small quantities are available.

France.—British buyers frequently purchase selected logs from stocks in Havre and Bordeaux which have been shipped direct from the French Ivory Coast and the French Congo. It is these logs that are credited to France in the British customs statistics.

United States.—The imports of mahogany logs from the United States represent logs imported into that country from Cuba and Central America and later shipped to British buyers.

Borneo.—Small quantities of "mahogany" (actually Serayah) are imported from British North Borneo largely in the form of clear sawn squares 4 by 4 inches, 5 by 5 inches, 6 by 6 inches, from 10 to 20 feet long, and lumber. These squares are used chiefly in the textile industries for rollers.

Brazil.—Brazilian mahogany is also imported in small quantities. It is sawn on all four sides with a heavy wane on each edge. It is very hard and brittle and a peculiar feature is the presence of pitch pockets. It does not store well and deteriorates rapidly.

Peru.—Small sample shipments of mahogany have within recent times been received from Peru, but insufficient time has elapsed to allow the trade to arrive at an accurate estimate of its properties and values.

PORTS OF ENTRY

Liverpool.—Liverpool has been the center of the African mahogany trade for over 50 years and about three-quarters of the total imports pass through that city. Most of the Borneo and Brazilian imports also enter through this port.

Imports of mahogany logs into Liverpool during the year 1926 are shown in the following table:

	Logs	Superficial feet
West African:		
Grand Bassam	5, 587	4, 882, 349
Grand Bassam (round)	47	82, 589
Grand Lahou	546	627, 578
Grand Lahou (round)	170	216, 810
Fresco	145	193, 468
Fresco (round)	7	5, 880
Half Assinie	521	558, 883
Axim	779	521, 937
Seccondee	1, 932	1, 524, 505
Accra	691	620, 813
Accra (round)	5	4, 533
Warri	5	4, 273
Jameson River	27	31, 027
Benin	4, 282	2, 940, 135
Benin (round)	107	86, 962
Lagos	1, 944	1, 573, 586
Lagos (round)	326	367, 260
Sapele	994	882, 005
Duala	42	42, 038
Duala (round	5	2, 900
West African—Continued.	47	21, 726
Cape Lopez	27	14, 953
Cape Lopez (round)	553	277, 921
Gabon	2	2, 188
Port Harcourt (round)	26	27, 556
Sundry ports		
Total	18, 817	15, 513, 875
All other:	123	100, 632
Tabasco (round)	75	36, 024
Nicaraguan (round)	156	19, 993
Santo Domingo	21	1, 600
Santo Domingo (round)	180	26, 244
Cuban	2	397
Cuban (round)	411	854, 404
Borneo	422	664, 881
Borneo (round)	110	130, 000
Peruvian (round)		
Total	1, 500	1, 834, 175

London.—London is the center of the Central American mahogany trade, very little entering through other British ports. In addition to this, London is second to Liverpool in importance as a market for African logs. Imports of mahogany logs into London during 1926 are shown in the following statement:

	Tons
Honduras	3, 872
Mexican (Tabasco, etc.)	657
Nicaragua and Guatemala	135
Africa:	
Sundry ports	10, 936
Gabon	7, 431
Costa Rica	169
Colombia and Venezuela	34
Cuba	1, 468
Santo Domingo and Jamaica	359
Total	25, 061

METHODS OF IMPORT TRADE

Practically all of the mahogany logs imported into the United Kingdom are sold at public auction, with the exception of Gabon, which is generally sold by private contract, usually on a c. i. f. basis. These auctions are held regularly in London and Liverpool and are attended by buyers from all over the United Kingdom and the Continent. The United States is also represented at these sales and many selected logs are shipped to that country for veneer each year.

Mahogany lumber is handled in the same manner as any other hardwood, sales usually being made for forward delivery on a c. i. f. basis.

Conditions of sale at mahogany auctions.—The following are the conditions governing the mahogany auction sales held in Liverpool:

1. The highest bidder in time to be the purchaser. If any dispute in bidding arises same shall be settled by the auctioneer; whose decision is final.

2. The auctioneer may, without giving any reason therefor, refuse to accept the bid of any person or persons.

3. The wood to be taken with all faults, defects, and errors of description of whatsoever nature or kind, as it now lies, at the measurement as declared by the selling brokers, or if by weight, at the landing account. To be entirely at the purchaser's expense after the fourteenth day from the day of sale, if stored in the yard, or three days if stored on the quay. All wood remaining in the yards beyond 14 days to be subject to a rental per week of 4d. per 400 sale feet. Wood remaining in the yards beyond four weeks from sale date may be removed and repiled by the brokers at buyer's expense

4. Minimum advances in bids shall be made in accordance with the following schedule:

Advance ¼d. per foot on prices under 5d. per foot.
Advance ½d. per foot on prices of 5d. to 11½d. per foot.
Advance 1d. per foot on prices of 1s. to 2s. 5d. per foot.
Advance 2d. per foot on prices of 2s. 6d. to 4s. 10d. per foot.
Advance 3d. per foot on prices of 5s. and upwards per foot.

5. The goods to be paid for within seven days from date of sale, in cash, less six months' discount at 5 per cent per annum (or the Bank of England rate on the day of sale, if higher), or at brokers' option by draft, approved by the brokers, due at four months from date of sale, allowing two months' interest.

6. If required by the brokers, the buyer shall pay deposit of 10 per cent of the amount of the purchase when each lot is knocked down, and failing to do so, the lot to be put up again.

7. Upon failure to comply with any of the above conditions, the deposit (if any) to be forfeited, and the brokers to have the right to resell the wood, with or without giving notice thereof to the defaulter, at public auction or by private contract, and the deficiency or loss, if any, arising from such resale shall be made good by the defaulter. Any profit that may arise from the resale to be for sellers' account.

8. The brokers shall provide the necessary plant and labor for delivering logs onto the buyers' carts, and for this service the buyers shall pay to the brokers 2s. 2d. per 400 sale feet.

9. The goods to be at the risk of the sellers in respect of fire (unless caused by war, riot, or civil commotion) for 14 days from day of sale, provided such goods have not been removed from the yards. In the event of nondelivery by loss from fire, the contract for such portion to be void and the deposit, if any paid, to be returned.

The conditions ruling in London are similar, the only differences being slight changes in terms of payment and that delivery is made by the Port of London Authority at buyers' expense instead of by the brokers.

Unit of sale.—The unit of sale for mahogany, logs and timber, whether by auction or private sale, is generally the board foot, according to brokers' "sale measure." Round logs are also at times sold by the cubic foot. Occasionally, however, to suit the convenience of the buyer and to save measuring charges it is sold by weight. In this event, the unit of sale is the long ton of 2,240 pounds.

Method of measuring.—To ascertain the "sale measure" contents of mahogany hewn logs the length of the piece is taken to the nearest half foot and the sides measured with a "mahogany rule" about one-third from the small end to the full inch, except that half inches are taken in the thicknesses up to 12 inches in all kinds except Cuba and Santo Domingo, when the limit is 15 inches. Tapering timber, however, applying particularly to Cuban and Tabasco (Mexican) is divided into several lengths and measurements (called "joggles") so as to arrive at the actual "sale" contents of the piece. The "mahogany rule" allows ⅛ inch to each inch to take care of saw kerf; for example, 16 inches actual equals 14 mahogany inches and 20 inches equals 17½ inches, the extreme contents being the full board measurement.

The extreme contents, however, are shown merely to illustrate the actual size of the log and not for invoice purposes. Additional allowance is made by the brokers' measure to cover any irregularities in size or length and any defects there may be in the piece, such as rotten heart, bad knots, shakes, splits, and worms. In order that the prospective buyer may have full information, auction catalogues show the length, depth at butt or center, "extreme" contents and "sale" contents, the last mentioned being the net or invoice quantity after all deductions have been made. In the case of tapering timber it is impossible to give the depth at center as there is no single center in a piece of this character, so that only the depth at the butt and extreme length is shown. Neither is the separate contents shown for each section into which it is divided, but only the grand total.

The following is an example of the measurements shown in a mahogany auctioneers' catalogue: Length, 21 feet; depth at center, 24 inches; extreme contents, 966 board feet; sale contents, 717 board feet.

In auction catalogues only the width of the piece is shown and not both sides, neither are any details given as to how the "sale contents" is arrived at, the brokers' measure being accepted by the buyer. Complete measurements are, however, supplied with the invoice.

The unit of sale for round logs is either the cubic foot or superficial foot board measure, computed by multiplying the quarter girth in inches, taken in the center with a string or tape, by the length taken to the half foot, and reducing the contents to cubic or superficial feet by using 144 as a divisor if to cubic feet, or 12 to superficial feet. Any fraction of a cubic foot is reduced to superficial feet. In mahogany an allowance is made in the length for defects.

This method of computing the contents of round logs is known as the Hoppus system, or if an allowance is made for defects "broker's tape measure on Hoppus system with allowance for defects."

PRICES

The following table shows the prices obtained for Central American and African mahogany at the public auctions held in Liverpool and London during 1926:

Description	Logs	Superficial feet	Average price, per superficial foot
LIVERPOOL			*d.*
Grand Bassam	3,752	3,596,629	5½
Grand Lahou	230	240,845	$5\frac{21}{32}$
Fresco	98	124,102	$6\frac{1}{16}$
Acquidah	14	9,182	$4\frac{11}{32}$
Half Assinie	258	263,306	$11\frac{1}{32}$
Axim	545	373,106	$5\frac{19}{32}$
Seccondee	1,440	1,158,552	$5\frac{21}{32}$
Accra	387	383,033	$6\frac{1}{32}$
Benin	3,366	2,519,409	$5\frac{19}{32}$
Lagos	1,521	1,260,052	5⅞
Sapele	588	540,714	$5\frac{1}{16}$
Lagos, Benin, etc	479	349,918	$3\frac{11}{32}$
Degama, etc	476	291,296	$6\frac{3}{32}$
Abonema	128	73,999	$5\frac{11}{32}$
Warri	5	4,273	$4\frac{1}{16}$
Jameson River	19	21,608	$4\frac{21}{32}$
Duala	68	71,241	$5\frac{1}{16}$
Cape Lopez	6	3,730	$3\frac{21}{32}$
Gabon	19	4,324	$3\frac{1}{32}$

Description	Logs	Superficial feet	Average price per cubic foot
LIVERPOOL—continued			*s.* *d.*
Grand Bassam (round)	14	19,764	4 $4\frac{13}{32}$
Grand Lahou (round)	4	3,536	3 1⅝
Fresco (round)	7	5,880	3 0¼
Benin (round)	14	13,971	3 $11\frac{7}{32}$
Abonema (round)	14	13,134	3 $1\frac{1}{32}$
Duala (round)	3	1,933	2 6
Cape Lopez (round)	7	5,446	3 0
			Per superficial foot
LONDON			*d.*
Honduras (round)	89	58,171	$12\frac{9}{32}$
Honduras	5,425	1,729,890	9
Nicaraguan	36	22,805	7½
Tabasco	9	9,295	$11\frac{27}{32}$
Tabasco (round)	9	14,051	$10\frac{3}{32}$
Mexican	126	27,324	$4\frac{9}{16}$
Mexican (round)	550	217,354	$3\frac{17}{32}$
Costa Rica	7	3,899	$17\frac{7}{32}$
Venezuelan	27	10,281	$6\frac{5}{16}$
African:			
Lagos	531	399,339	5½
Benin	1,011	809,913	$5\frac{5}{16}$
Sapele	230	250,862	5
Sapele (round)	5	8,148	$5\frac{29}{32}$
Grand Bassam	874	888,419	$5\frac{3}{32}$
Grand Lahou	37	31,216	$5\frac{5}{16}$
Axim	45	33,615	$2\frac{19}{32}$
Seccondee	84	73,582	$5\frac{9}{16}$
Cape Lopez	604	257,004	$3\frac{5}{16}$
Cape Lopez (round)	38	23,579	$2\frac{9}{32}$
Fresco	57	44,681	$2\frac{23}{32}$
Fresco (round)	92	79,294	$1\frac{15}{32}$
Sundry ports	66	77,528	$5\frac{15}{32}$
Santo Domingo	57	10,870	$13\frac{3}{32}$
Cuban	472	51,744	11⅞
Cuban (round)	46	4,722	$4\frac{9}{32}$
Brazilian	47	23,791	2⅞

PRINCIPAL USES

Central American and West Indian mahogany, on account of its rich color, texture, and high value, is used chiefly for the more expensive type of furniture, interior fittings of railroad passenger and Pullman cars, furniture, and panelwork in first-class passenger vessels, bank and office fittings of the higher type, pianos, talking machines, and radio cabinets.

In addition to these uses Cuban stock is preferred for the manufacture of articles subjected to hard wear, such as counter tops, and is almost exclusively used for the chairs in dining and smoking saloons of high-class passenger vessels when furnished in mahogany, as experience has shown it is the only variety that can withstand the strain caused by the constant vibration and motion of the sea.

African mahogany is used for the same purposes as the Central American, but where a less expensive wood is required.

Okoumé or Gabon mahogany has a woolly texture and, therefore, can not be dressed to a perfectly smooth finish, neither will it lie flat, but has a tendency to twist. For these reasons it is never used for panel or cabinet work except where it is not exposed to view, such as the backing of cheap furniture. One of its principal uses is for cutting into rotary veneer for the manufacture of plywood to be faced with the more expensive fancy hardwoods. Large quantities of Gabon plywood are used in the United Kingdom but it can not be profitably manufactured in competition with the continental product.

Gabon mahogany does not take a good polish but soaks up the stain, so that it is seldom left in the natural color but is generally painted or stained.

MAHOGANY LUMBER

The import trade in mahogany lumber is handled by the same method as any other hardwood lumber—that is, through agents to recognized importers—sales usually being on a c. i. f. basis, the principal market being London and, to a lesser extent, Liverpool, Manchester, and Glasgow. The following table shows imports of mahogany lumber during the year 1925:

Country	Quantity	Value
	Cubic feet	
United States	1,407,730	£568,535
French West Africa	149,387	32,582
British West Africa	147,372	34,766
France	49,938	17,749
British North Borneo	45,635	10,018
Mexico	23,909	6,605
Philippine Islands	9,637	2,415
British India	26,017	6,967
All other	59,699	18,553
Total	1,919,324	698,190

SOURCES OF SUPPLY

United States.—Approximately 80 per cent of the mahogany lumber imported by the United Kingdom comes from the United States, where it is manufactured, mostly in New Orleans and New York, from logs imported from British Honduras and other Central American producing countries, and graded according to the rules of the National Hardwood Lumber Association, Chicago, Ill.

The following qualities, first and second selects, No. 1 common, No. 2 common, in all thicknesses from ½ to 4 inches are imported, the heaviest demand being for 1 inch. In addition to these qualities there is also a demand for 1-inch No. 1 common and better sound wormy, which is used as a base where expensive veneers are to be used. Mahogany shorts also find a market here 1 to 3 feet in length.

West Africa—France.—The same varieties of mahogany as are imported into the United Kingdom in the form of hewn timber or logs are brought in as lumber. The lumber is both edged and wany—that is, from logs cut through and through in all thicknesses. It is usually shipped log run with culls out, although occasionally a little prime is furnished.

British North Borneo.—All thicknesses of lumber are imported, mostly in prime (clear) quality, in lengths from 10 to 20 feet.

Mexico.—Only very small quantities of mahogany lumber are imported from Mexico, it being in mill-run grade with culls out and in all thicknesses.

Philippine Islands.—Small quantities of red and white lauan, also tanguile, are sold in the British market as "Philippine mahogany." Of the lauans, the red variety is preferred, but it is usual for shippers to require a certain percentage of white to be included in a contract. Tanguile is more valuable than the lauans and is always sold separately from them. The texture of all of these is more or less hard and porous so that they are difficult to work and will not take a good polish.

These woods are imported in all thicknesses of lumber, 1, 1½, 2, 2½, 3, and 4 by 8 inches and wider, both rough and dressed, also in 4 by 4 inch, 5 by 5 inch, and 6 by 6 inch squares, and is used as a substitute for Central American and African mahogany in the furniture and cabinet making industries where a less expensive wood is required. Some red lauan has also been used for the manufacture of tanks used in textile mills with satisfactory results.

British India.—The quantity of mahogany imported from British India is so small that it is not considered a serious factor in the market. These imports are probably made up of a number of different species including white mahogany from the Andamans, as well as other descriptions, also imports from Burma. There is a fairly regular demand for white mahogany, but the business in the other descriptions is still in the introductory stages.

ASH

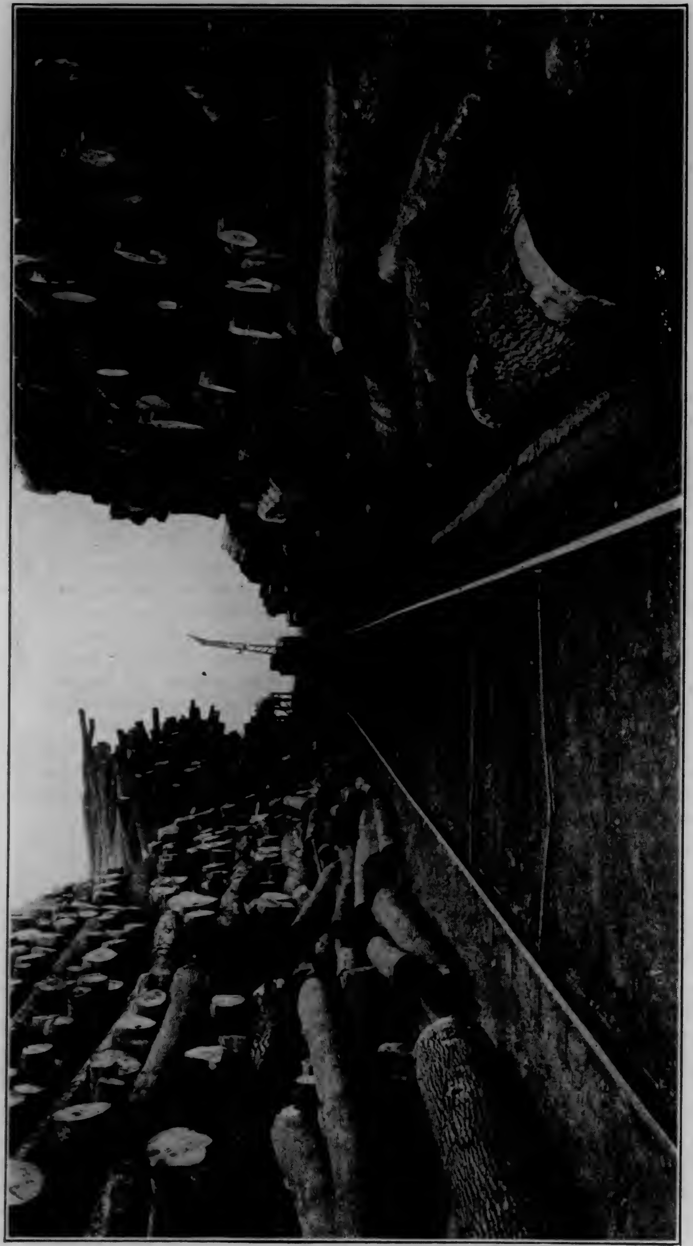
Ash is one of the historic woods of England and native stock was used to provide the spears and shields of the men at arms in the days of King Alfred the Great. To-day considerable quantities of ash are consumed annually in the United Kingdom and its use is likely to be increased. It is imported both in the form of lumber and round logs, the former greatly predominating. On account of its peculiar characteristics, ash is used for many purposes in Great Britain, where strength combined with flexibility and lightness is required.

It is, however, in the construction of automobiles, motor busses and trucks, and street cars, that ash is principally used in the United Kingdom. Other important consumers are the agricultural implement, airplane, sporting goods, and furniture industries.

SOURCES OF SUPPLY

The principal countries supplying the United Kingdom with ash are the United States, British Isles, Irish Free State, and Poland, while small quantities are received from Japan, Canada, Czechoslovakia, and Yugoslavia. The ash import trade is largely confined to the ports of London, Liverpool, Manchester, and Glasgow, with the first-named leading.

United States.—The United States supplies most of the ash consumed in the British market and, according to United States statistics, a total of over 15,000,000 board feet of ash lumber was shipped to the United Kingdom during 1926. In addition there was a considerable amount of logs, but unfortunately they are not segregated in American statistics. However, according to the London Timber Trades Journal, no less than 548,531 cubic feet of logs were also imported from the United States through the ports of London and Liverpool during 1925, chiefly through the former port. While ash



Photograph by F. N. Birkett, London.

FIG. 15.—American ash for British motor vehicle industry

log imports were exceptionally heavy during that year and probably were not equally so in 1926, nevertheless a large number were brought in during the latter year.

Most of the ash lumber purchased from the United States is of the white, firm-textured variety for use by the automobile and agricultural implement industries, and, contrary to other hardwoods, is shipped green or surface dry. In lumber, firsts, seconds, and No. 1 common and select qualities are purchased, the specifications being 1 to 4 inches thick, lengths and widths according to the rules of the National Hardwood Lumber Association. The furniture trade also uses American ash for drawer sides and backings, the mild textured variety being used for this purpose. The principal demand is for No. 1 common and select, and No. 2 common qualities, chiefly 1 inch and under.

Within the past year a demand has developed in the United Kingdom for ash shorts by the furniture trade, 1, 1¼, and 1½ inches thick, 4 to 7 feet long, by 4 inches and wider, in clear, No. 1 common and select, and No. 2 common, but very little of the last named. The boards are resawn or "deeped," as it is called in the furniture industry, into the required thicknesses and used for drawer sides and backs. It would appear that the demand for shorts is a fluctuating one, apparently being influenced to a large extent by the price of regular lengths, it being said that whenever the spread becomes less than a certain figure buyers stop taking the shorts and buy regular lengths instead.

According to reliable sources, it is estimated that during the past three years between 150,000 and 200,000 American ash logs have been imported, a large proportion of which went directly into consumption. These ash logs are purchased in what is known as "prime" quality, the usual specification being 12 inches and up diameter at the small end, 10 to 16 feet long. Only tough-textured white ash is acceptable and it is used exclusively for purposes where strength is required. These logs are sawn through and through to desired thicknesses in local sawmills and sold in this manner to the consuming industries. Unfortunately there are no recognized grading rules for ash logs and just what constitutes a "prime" log is largely a matter of individual opinion. Generally speaking, the British buyer expects fresh winter-felled butt cuts, free from visible defects and straight, on a contract calling for "prime" logs. It is therefore not to be wondered at that on practically every shipment there are a number of rejects. The Southern States furnish practically all of the American ash logs imported. Owing to the danger of worm and/or grub damage, they should not be cut or shipped except during the winter months. One of the principal complaints made against American ash logs is the prevalence of worms in them on arrival at British ports, which is in a large measure due to the logs being felled a considerable time before being shipped.

Owing to the different methods used to measure logs in Great Britain as compared with the United States, it is extremely difficult for an American exporter to figure accurately a c. i. f. quotation "Liverpool quarter girth" measure—the usual basis of sale, full particulars of which will be found in the section on "Measurement of lumber, timber, and round logs."

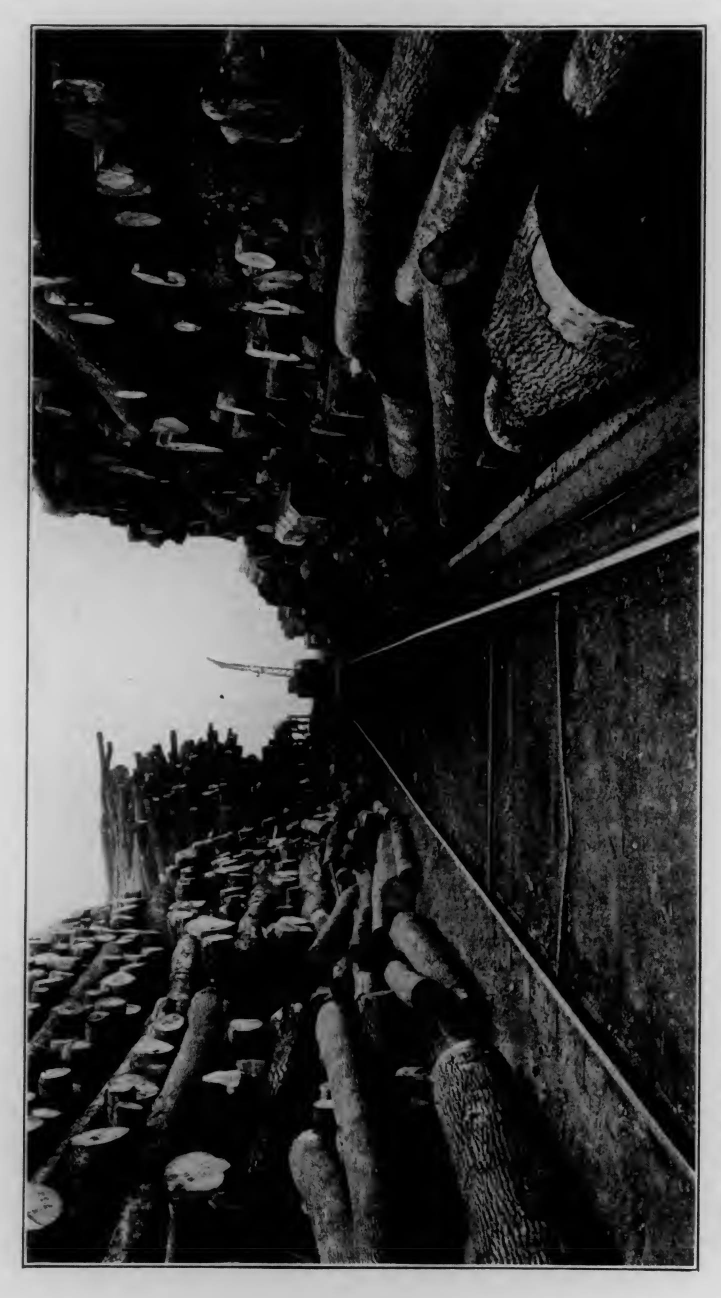


FIG. 15.—American ash for British motor vehicle industry

Photograph by F. N. Birkett, London.

log imports were exceptionally heavy during that year and probably were not equally so in 1926, nevertheless a large number were brought in during the latter year.

Most of the ash lumber purchased from the United States is of the white, firm-textured variety for use by the automobile and agricultural implement industries, and, contrary to other hardwoods, is shipped green or surface dry. In lumber, firsts, seconds, and No. 1 common and select qualities are purchased, the specifications being 1 to 4 inches thick, lengths and widths according to the rules of the National Hardwood Lumber Association. The furniture trade also uses American ash for drawer sides and backings, the mild textured variety being used for this purpose. The principal demand is for No. 1 common and select, and No. 2 common qualities, chiefly 1 inch and under.

Within the past year a demand has developed in the United Kingdom for ash shorts by the furniture trade, 1, 1¼, and 1½ inches thick, 4 to 7 feet long, by 4 inches and wider, in clear, No. 1 common and select, and No. 2 common, but very little of the last named. The boards are resawn or "deeped," as it is called in the furniture industry, into the required thicknesses and used for drawer sides and backs. It would appear that the demand for shorts is a fluctuating one, apparently being influenced to a large extent by the price of regular lengths, it being said that whenever the spread becomes less than a certain figure buyers stop taking the shorts and buy regular lengths instead.

According to reliable sources, it is estimated that during the past three years between 150,000 and 200,000 American ash logs have been imported, a large proportion of which went directly into consumption. These ash logs are purchased in what is known as "prime" quality, the usual specification being 12 inches and up diameter at the small end, 10 to 16 feet long. Only tough-textured white ash is acceptable and it is used exclusively for purposes where strength is required. These logs are sawn through and through to desired thicknesses in local sawmills and sold in this manner to the consuming industries. Unfortunately there are no recognized grading rules for ash logs and just what constitutes a "prime" log is largely a matter of individual opinion. Generally speaking, the British buyer expects fresh winter-felled butt cuts, free from visible defects and straight, on a contract calling for "prime" logs. It is therefore not to be wondered at that on practically every shipment there are a number of rejects. The Southern States furnish practically all of the American ash logs imported. Owing to the danger of worm and/or grub damage, they should not be cut or shipped except during the winter months. One of the principal complaints made against American ash logs is the prevalence of worms in them on arrival at British ports, which is in a large measure due to the logs being felled a considerable time before being shipped.

Owing to the different methods used to measure logs in Great Britain as compared with the United States, it is extremely difficult for an American exporter to figure accurately a c. i. f. quotation "Liverpool quarter girth" measure—the usual basis of sale, full particulars of which will be found in the section on "Measurement of lumber, timber, and round logs."

Poland.—Ash from Poland meets with fair favor in the United Kingdom, particularly on account of the large dimensions in which it is procurable, and imports have now reached fairly large proportions. These are almost exclusively in the form of logs, although a small quantity of unedged lumber obtained by sawing the logs through and through is also brought in, London being the principal market. A usual specification calls for 12 inches and up diameter at the small end, at least 50 per cent 16 inches and up. The texture of this ash varies, but the best compares favorably with the American white variety and for that reason is used very largely by the automobile trade. Another factor in favor of the Polish ash from the British importers' point of view is its freedom from worms. The inability of Polish lumber exporters to finance their trade and to furnish regular supplies has restricted shipments in the past, but great efforts are being made to increase them. If these are successful, America will likely feel this competition more in the future than she has in the past. It must not be overlooked that the demand for Polish ash has been developed in Great Britain in the face of its selling for approximately $10 to $15 per M feet over the American variety.

England and Irish Free State.—At one time English ash, especially in the log form, was a very serious competitor of American ash, it being used by practically the same industries, chiefly the automobile. During the 1920 boom these ash logs were available at lower prices than the American product, and better specifications as regards diameter and especially as to lengths were obtainable. Another factor that helped the market for native stock was the fact that when these logs were cut and sticked for seasoning purposes, they retained to a very much greater extent their toughness and weight than American ash. However, an undesirable feature, at least from the merchant's point of view, is that, on account of its texture, English ash must be seasoned considerably longer than the American before it can be used.

Within the last three or four years, however, American ash in log form has been largely imported into the United Kingdom at prices below those which would have to be paid for prime English stock. Although consumers would prefer, all other things being equal, to use British logs, at the same time the American stock being available in fairly good specifications and at a lower price has caused the business to be placed in the United States. The breaking up of many large estates into small holdings has resulted in the wholesale cutting of timber by the new owners for revenue purposes, and many of the remaining large estate owners are selling off their large timber without replacing it.

Although the ash logs imported into the United Kingdom from the Irish Free State do not compare as to specification with the English, they do compare favorably with the American, and the texture is considered about halfway between English and American for toughness and firmness. English and Irish Free State ash is mostly purchased in the log, f. o. b. loading point, from farmers and private landowners by what are known as home timber merchants, who have buyers going around the country looking for supplies. Many of these merchants operate sawmills in connection with their business and the logs are usually sent direct to the mill and sawn through and through to the thicknesses required, then sticked for seasoning. Merchants who do not operate sawmills have the sawing done at custom plants.

English ash is preferred to all others for airplanes and by builders of high-class automobile bodies and delivery vans where extreme bending properties are required for the body. It is also preferred by manufacturers of sporting goods, it being especially regarded for the rims of tennis rackets.

During the early summer of 1927, English ash logs were selling for approximately 3s. 6d. to 4s. per cubic foot, free on rails loading point, which means a selling price of about 6s. or 7s. per cubic foot for the logs sawn through and through ex merchants' yard. This is too expensive for the mass-production automobile plants, where price is a prime consideration, and its use is largely confined to manufacturers requiring an especially high-grade wood where price is a secondary matter.

Central Europe, Russia, and Japan.—Small quantities of ash, both lumber and logs, are imported into Great Britain from Czechoslovakia, Yugoslavia (Slavonian), Russia, and Japan, but the quantity is insignificant. The Japanese product is of a soft texture, brown in color, and used exclusively for furniture making. In pre-war days ash from Hungary was considered superior to all others, but none has been received for many years. In addition to these countries, during 1925 some fair-sized parcels of logs were received in London from Albania, but they appear to have ceased as none has arrived for some time.

SUGGESTIONS FOR AMERICAN EXPORTERS

While up to the present time the United States has held its own in the United Kingdom ash market, it must not be assumed that competitors are going to sit still and make no effort to secure the business if it is possible. Many complaints are made by importers against the texture of shipments received on contracts calling for "tough and/or firm-textured white ash" and it is the opinion of some that this species is becoming scarce in the United States. Excessive worm and/or grub holes is another complaint frequently made against the American wood and although these may be permitted under the grading rules, it places United States stock at a disadvantage with that received from competitive countries which is free from this defect.

Constant fluctuations in price are also a great detriment to business and every substantial advance opens the way for substitutes. Few materials are indispensable and with a growing tendency in the British automobile trade toward all-metal bodies it would be unfortunate if American ash exporters should do anything to further that policy. American exporters of tough and/or firm-textured white ash, such as is desired by the British automobile trade, should therefore be careful not to play into the hands of their competitors, who are never slow to take advantage of every opportunity to win business by making importers dissatisfied either through the quality or texture of the stock shipped or by neglecting to supply their needs when the demand is good in the domestic market.

TEAK

Teak is highly valued in the United Kingdom, its peculiar properties making it preferred to any other species for many purposes. In its green state it will not float so that, in order to dry the logs sufficiently to enable them to be floated down the rivers, the standing timber is first killed by girdling, i. e., removing a section of the bark and sapwood and leaving the trees two or more years before felling. The timber and lumber thus arrives in the United Kingdom in a fairly dry condition, weighing about 45 pounds to the cubic foot, so that little shrinkage takes place later. On account of the high cost of transportation, only selected stock, fairly free from knots and other defects, is shipped to the United Kingdom.

FIG. 16.—Teak timber and flitches in importer's yard; each piece branded and numbered

Teak does not warp, split readily, or sliver, has an even straight grain and is mild in texture, which makes it easy to work. A peculiarity of teak is that it contains an oil, more pronounced in Burma and Siam shipments than others, which resists the action of water and acts as a preventive against rust when iron is in contact with it. The fact that it resists the ravages of the termite or white ant, also fire, are other special attributes. These qualities, in conjunction with its rich brown color, exceptional wearing qualities, and strength, make it almost an ideal wood for many purposes and only its comparatively high price prevents its greater use.

SOURCES OF SUPPLY

In the United Kingdom market teak is divided into three categories or classifications designated by the countries of origin: Burma or Siam, Saigon (French Indo-China or Cochin China), and Java.

The Burma variety is shipped almost entirely from Rangoon, with a small amount from Moulmein, the Siam from Bangkok, and the Cochin China from Saigon, while the Java variety comes from the Netherland East India island of that name.

Although more expensive, the Burma or Siam teak is greatly preferred to the Javan on account of its milder texture, greater freedom from defects and better specifications, particularly as to lengths in which it can be obtained. On the other hand, the Java teak is often extremely hard, making it difficult to work; it also contains more defects than the East India, is shorter in length, and is largely hewn making it more wasteful in conversion. For these reasons, very little of it is used and imports are of insignificant proportions.

According to preliminary estimates, the production of teak in Burma during 1926 amounted to approximately 300,000 loads of 50 cubic feet each, which was shipped to the following markets:

	Loads
Europe, Africa, and America	54, 000
India and Asia	196, 000
Local consumption in Burma	50, 000
Total	300, 000

The production in Siam was about 54,000 loads, during the same period, which were shipped to the following markets:

	Loads
Europe, Africa, and America	4, 653
India and Asia	49, 347
Total	54, 000

The situation in Burma during 1926 was a difficult one, according to a leading British agent in close touch with conditions in that country, because, owing to a variety of causes, the output from the forests was below requirements, partly as a result of bad floating conditions. It was estimated that the shortage of round logs arriving from the forests at the sawmills in Rangoon amounted to about 20 to 25 per cent as compared with previous normal years, owing to many logs being held up in the forest streams unable to reach the river, and to reduced girdlings in previous years necessitated by the requirements of the forest felling rotation schedules.

The following table shows imports of teak into the United Kingdom during 1925:

Country	Timber		Lumber		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Cubic feet		*Cubic feet*		*Cubic feet*	
Java	563	£1, 721	3, 456	£1, 678	4, 019	£1, 850
Siam	5, 050	2, 520	161, 962	77, 065	167, 012	79, 585
British India	30, 067	15, 441	1, 660, 648	748, 755	1, 690, 715	764, 196
French Indo-China			83, 196	30, 390	83, 196	30, 390
Philippine Islands			43, 192	11, 580	43, 192	11, 580
Straits Settlements			501	130	501	130
All other	2, 550	765	17, 987	5, 252	20, 537	6, 017
Total	38, 230	18, 898	1, 970, 942	874, 850	2, 009, 172	893, 748

Referring to the figures in the foregoing table, one of the leading London agents for teak doubts the accuracy of the total for "timber"

TEAK

Teak is highly valued in the United Kingdom, its peculiar properties making it preferred to any other species for many purposes. In its green state it will not float so that, in order to dry the logs sufficiently to enable them to be floated down the rivers, the standing timber is first killed by girdling, i. e., removing a section of the bark and sapwood and leaving the trees two or more years before felling. The timber and lumber thus arrives in the United Kingdom in a fairly dry condition, weighing about 45 pounds to the cubic foot, so that little shrinkage takes place later. On account of the high cost of transportation, only selected stock, fairly free from knots and other defects, is shipped to the United Kingdom.

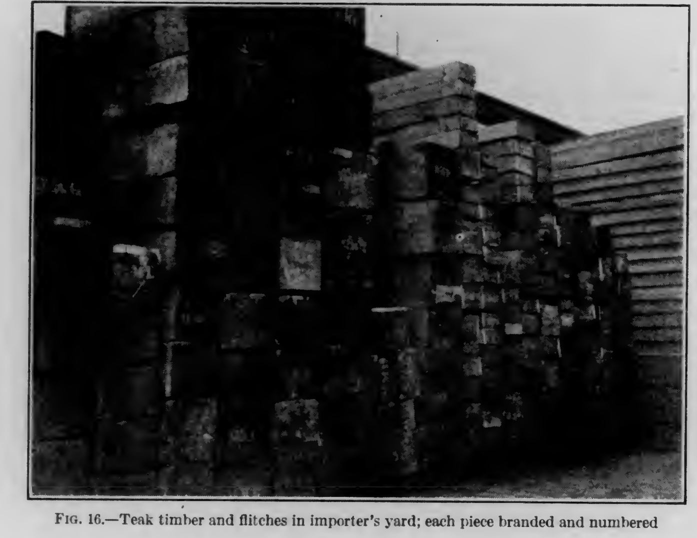


FIG. 16.—Teak timber and flitches in importer's yard; each piece branded and numbered

Teak does not warp, split readily, or sliver, has an even straight grain and is mild in texture, which makes it easy to work. A peculiarity of teak is that it contains an oil, more pronounced in Burma and Siam shipments than others, which resists the action of water and acts as a preventive against rust when iron is in contact with it. The fact that it resists the ravages of the termite or white ant, also fire, are other special attributes. These qualities, in conjunction with its rich brown color, exceptional wearing qualities, and strength, make it almost an ideal wood for many purposes and only its comparatively high price prevents its greater use.

SOURCES OF SUPPLY

In the United Kingdom market teak is divided into three categories or classifications designated by the countries of origin: Burma or Siam, Saigon (French Indo-China or Cochin China), and Java.

The Burma variety is shipped almost entirely from Rangoon, with a small amount from Moulmein, the Siam from Bangkok, and the Cochin China from Saigon, while the Java variety comes from the Netherland East India island of that name.

Although more expensive, the Burma or Siam teak is greatly preferred to the Javan on account of its milder texture, greater freedom from defects and better specifications, particularly as to lengths in which it can be obtained. On the other hand, the Java teak is often extremely hard, making it difficult to work; it also contains more defects than the East India, is shorter in length, and is largely hewn making it more wasteful in conversion. For these reasons, very little of it is used and imports are of insignificant proportions.

According to preliminary estimates, the production of teak in Burma during 1926 amounted to approximately 300,000 loads of 50 cubic feet each, which was shipped to the following markets:

	Loads
Europe, Africa, and America	54, 000
India and Asia	196, 000
Local consumption in Burma	50, 000
Total	300, 000

The production in Siam was about 54,000 loads, during the same period, which were shipped to the following markets:

	Loads
Europe, Africa, and America	4, 653
India and Asia	49, 347
Total	54, 000

The situation in Burma during 1926 was a difficult one, according to a leading British agent in close touch with conditions in that country, because, owing to a variety of causes, the output from the forests was below requirements, partly as a result of bad floating conditions. It was estimated that the shortage of round logs arriving from the forests at the sawmills in Rangoon amounted to about 20 to 25 per cent as compared with previous normal years, owing to many logs being held up in the forest streams unable to reach the river, and to reduced girdlings in previous years necessitated by the requirements of the forest felling rotation schedules.

The following table shows imports of teak into the United Kingdom during 1925:

Country	Timber		Lumber		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Cubic feet		*Cubic feet*		*Cubic feet*	
Java	563	£1, 721	3, 456	£1, 678	4, 019	£1, 850
Siam	5, 050	2, 520	161, 962	77, 065	167, 012	79, 585
British India	30, 067	15, 441	1, 660, 648	748, 755	1, 690, 715	764, 196
French Indo-China	----	----	83, 196	30, 390	83, 196	30, 390
Philippine Islands	----	----	43, 192	11, 580	43, 192	11, 580
Straits Settlements	----	----	501	130	501	130
All other	2, 550	765	17, 987	5, 252	20, 537	6, 017
Total	38, 230	18, 898	1, 970, 942	874, 850	2, 009, 172	893, 748

Referring to the figures in the foregoing table, one of the leading London agents for teak doubts the accuracy of the total for "timber" and, in his opinion, a considerable quantity has been included with "lumber" owing to incorrect description being given on customs entry forms by importers.

PRINCIPAL PORTS OF ENTRY

Liverpool, London, and Glasgow are the principal ports of entry for teak in the United Kindgom, in the order of their importance. Occasionally small quantities are imported direct to Belfast, Leith, Hull, and Avonmouth (Bristol).

The teak trade at the principal ports of entry during 1926 was as shown in the following statement:

	Loads
Liverpool (all descriptions):	
Burma and Siam	10, 106
Java	119
Total	10, 225
London:	
Burma and Siam—	
Timber	5, 283
Lumber	2, 067
Java—	
Timber	28
Lumber	26
Total	7, 404
Glasgow:	
Timber	1, 387
Decking	1, 660
Lumber	3, 008
Total	6, 055

The London figures do not include imports, principally lumber, delivered overside into barges, which are considerable, but only such arrivals as were landed at the docks controlled by the Port of London Authority.

Practically all the imports into Glasgow were from Burma, less than 100 loads coming from Siam and none whatever from Java.

SPECIFICATIONS AND QUALITIES

Teak is imported in the form of round logs, sawn and hewn timber, lumber, and flitches. Flitches are planks 4½ inches and thicker, free of centers. The quantity of round logs is small, as they are not liked in the United Kingdom; neither is the hewn timber, which is imported almost entirely from Java.

The usual specification of sawn or hewn timber is 10 by 10 inches and up, chiefly 12 by 12 inches and up in three qualities known sometimes as first, second and third, while some shippers use names such as "prime," "crown," and "star" to indicate the quality.

Lumber is sold on an average length, width, and thickness basis, planks being 2½ inches and thicker, 6 inches and wider by 6 feet and up long, the average varying from 8 feet by 8 inches by 3½ inches to 20 feet by 11 inches by 3½ inches or more.

Boards are 1, 1¼, 1½, and 2 inches thick as a rule, although occasionally ½ and ¾ inch are called for. The usual average on which boards are sold is 8 feet by 8 inches or 9 feet by 9 inches.

Decking is an important item, the usual sizes being 2½ and 3 by 5 inches wide, 16 feet and longer, averaging about 20 feet.

Planks, boards, and decking are imported in three qualities, known as first, intermediate, and second, but very little decking is sold in the last-named quality.

Sawn and hewn timber is measured to the extreme contents, based on caliper measure taken in center of piece, while round logs are measured according to the Hoppus system.

In addition to these items, large quantities of small blocks, about 2¼ by 3$\frac{7}{16}$ inches either 6 or 7 inches long, in various shapes known as "keys" are imported for use by the British railroads.

PRICES

At the end of April, 1927, the market values for teak c. i. f. London, per load of 50 cubic feet, depending on quality and specification required, were as shown in the following statement:

Burma or Siam:	
Timber	£23 to £42.
Heavy planks	£30 to £40.
Light planks and boards	£24 to £40.
Java:	
Timber	£17 10s. to £27.
Hewn heavy planks	£18 to £30.
Sawn light planks and boards	£17 to £28.

PRINCIPAL USES

On account of the oil it contains, making it impervious to the weather, teak is considered the premier wood by the British shipbuilding industry for the exposed portions of vessels because it acts as a preventive against rust when iron is in contact with it. While consumption of teak has been somewhat curtailed during the past few years, owing to fewer battleships and high-class passenger vessels being built, considerable quantities are still used in the shipbuilding industry. For vessels trading in the tropical and far eastern trade teak is a necessity on account of its resistance to the white ant or termite, and is always used for the decks and other parts of the superstructure made of wood, such as deck houses, officers' quarters, chart house, rails, companion ladders, and panel work. The lifeboats on such vessels are also made of teak. It is also used where a superior wood is required and where cost is not a first consideration for first-class cargo vessels, especially where owners carry their own insurance. On account of the larger sizes, greater oil content, and easier working, Burma or Siam wood is preferred for shipbuilding.

Equal, if not of greater importance, to shipbuilding as a consumer of teak is the railway passenger car building industry. Not only is the building of railroad passenger cars for foreign countries where the white ant is prevalent an important industry in Great Britain, but most of those used by the British railroads themselves are built out of this species on account of its excellent wearing qualities.

The British railroads use a somewhat different method of laying rails than the American in that they are fastened to the ties by iron blocks called "chairs" instead of being laid directly on them. The space in the chair taking the rail is about 2 inches wider than the rail itself. To hold the rail tight, a wooden wedge is driven between it and the side of the chair. Not only does this wedge hold the rail firmly in position, but the removal of them makes the replacing of any rail a comparatively simple matter. These wooden wedges are known as "keys." Teak has been found extremely suitable for this purpose on account of its imperviousness to the weather, and large quantities are imported each year into Great Britain for this purpose.

It is also used to a large extent for high-class fittings in banks, hotels, municipal and other public buildings, and store fronts. Being of milder texture and taking a better finish, the Burma or Siam stock, or even Saigon wood, is preferred for these purposes to Java.

On account of its resistance to decay even when constantly subjected to drying and wetting, such as from constant washing, many hospitals are floored with teak, blocks being the form preferred.

Unlike other countries, such as the Netherlands and the Far East, Great Britain has never favored teak for furniture, its high cost as compared with other hardwoods, strong odor, and dull color, being against it. However, there is a certain demand for novelty items, such as tables, chairs, and garden seats made of teak from old battleships on account of its historic interest, also for the manufacture of furniture for export. Some of the old battleships contain as much as 600 to 1,000 tons of teak, a fair amount of which can be reclaimed when the vessel is broken up.

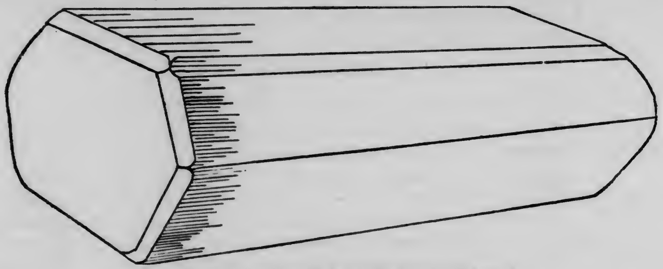


FIG. 17.—Wooden "key" for holding rails in "chairs"

AFRICAN TEAK

Iroko, also called African teak, is imported from West Africa in small quantities. It is strong, durable, and straight-grained and is used in place of the genuine teak on account of its cheaper price. The use of Iroko, however, is not permitted where specifications call for teak. Recently the British courts have rendered a decision against a contractor who had used it against an architect's specification for teak, although the lumber dealer had sold it to him as Iroko teak.

WALNUT

Walnut is next in importance to oak and mahogany as a high-class furniture and finishing wood in the United Kingdom. It has long been known for its attractive appearance, stability, strength, and wearing qualities, many dressing tables and other intimate articles of furniture of the Queen Anne period (early eighteenth century) noted for their graceful beauty being made of walnut, while still earlier articles, dating from the fifteenth century, are to be found in one of the London museums. Although through the changes of fashion it suffered a temporary eclipse, other woods replacing it, during recent years walnut has been increasing in favor with the British public.

For high-class store, bank, and office fittings it has gained a position second to no other species, and when several of the great London department stores built additions, or were extensively remodeled after the war, walnut, in the face of severe competition from other species, was chosen for the window panels and interior fixtures and fittings, which are the admiration of all who see them to-day. Many banks, private offices, and directors' rooms in London and the larger provincial cities have also been fitted with walnut during the past few years, while for gunstocks and airplane propellers millions of feet were used during the Great War, no other species being found more suitable for these purposes. Naturally this increased demand has not come about of its own volition but has been largely influenced by the efforts of American manufacturers interested in the market by advertising in the press and distributing illustrated literature supporting their accredited British agents in bringing to the public attention the superior qualities and natural beauty of this wood. American manufacturers are not the only ones that have benefited by these efforts, but the sales of other varieties of walnut have increased by the growing popularity of this species as a finishing and furniture wood in Great Britain.

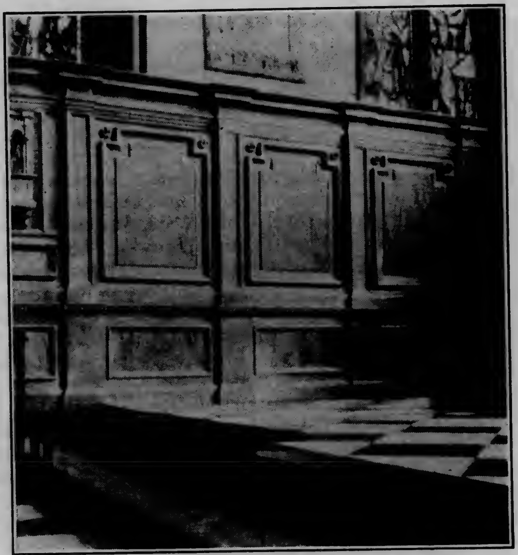


FIG. 18.—Walnut paneling in chapel of Balliol College, Oxford

SOURCES OF SUPPLY

The principal source of Great Britain's walnut needs is the United States, followed to a lesser extent by France. Small quantities are also received from West Africa. Formerly Italian and Black Sea (Circassian) walnut was imported, but these have practically ceased, the Italian imports being all imported in the form of veneer, while the Circassian is seldom used except for the manufacture of the any rail a comparatively simple matter. These wooden wedges are known as "keys." Teak has been found extremely suitable for this purpose on account of its imperviousness to the weather, and large quantities are imported each year into Great Britain for this purpose.

It is also used to a large extent for high-class fittings in banks, hotels, municipal and other public buildings, and store fronts. Being of milder texture and taking a better finish, the Burma or Siam stock, or even Saigon wood, is preferred for these purposes to Java.

On account of its resistance to decay even when constantly subjected to drying and wetting, such as from constant washing, many hospitals are floored with teak, blocks being the form preferred.

Unlike other countries, such as the Netherlands and the Far East, Great Britain has never favored teak for furniture, its high cost as compared with other hardwoods, strong odor, and dull color, being against it. However, there is a certain demand for novelty items, such as tables, chairs, and garden seats made of teak from old battleships on account of its historic interest, also for the manufacture of furniture for export. Some of the old battleships contain as much as 600 to 1,000 tons of teak, a fair amount of which can be reclaimed when the vessel is broken up.

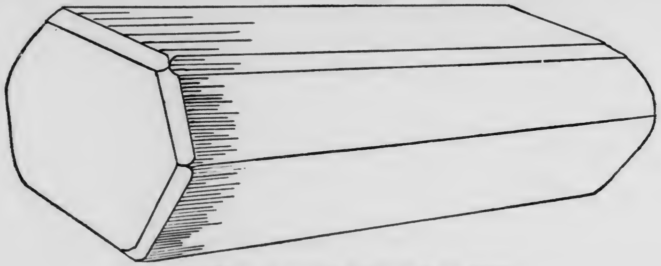


FIG. 17.—Wooden "key" for holding rails in "chairs"

AFRICAN TEAK

Iroko, also called African teak, is imported from West Africa in small quantities. It is strong, durable, and straight-grained and is used in place of the genuine teak on account of its cheaper price. The use of Iroko, however, is not permitted where specifications call for teak. Recently the British courts have rendered a decision against a contractor who had used it against an architect's specification for teak, although the lumber dealer had sold it to him as Iroko teak.

WALNUT

Walnut is next in importance to oak and mahogany as a high-class furniture and finishing wood in the United Kingdom. It has long been known for its attractive appearance, stability, strength, and wearing qualities, many dressing tables and other intimate articles of furniture of the Queen Anne period (early eighteenth century) noted for their graceful beauty being made of walnut, while still earlier articles, dating from the fifteenth century, are to be found in one of the London museums. Although through the changes of fashion it suffered a temporary eclipse, other woods replacing it, during recent years walnut has been increasing in favor with the British public.

For high-class store, bank, and office fittings it has gained a position second to no other species, and when several of the great London department stores built additions, or were extensively remodeled after the war, walnut, in the face of severe competition from other species, was chosen for the window panels and interior fixtures and fittings, which are the admiration of all who see them to-day. Many banks, private offices, and directors' rooms in London and the larger provincial cities have also been fitted with walnut during the past few years, while for gunstocks and airplane propellers millions of feet were used during the Great War, no other species being found more suitable for these purposes. Naturally this increased demand has not come about of its own volition but has been largely influenced by the efforts of American manufacturers interested in the market by advertising in the press and distributing illustrated literature supporting their accredited British agents in bringing to the public attention the superior qualities and natural beauty of this wood. American manufacturers are not the only ones that have benefited by these efforts, but the sales of other varieties of walnut have increased by the growing popularity of this species as a finishing and furniture wood in Great Britain.

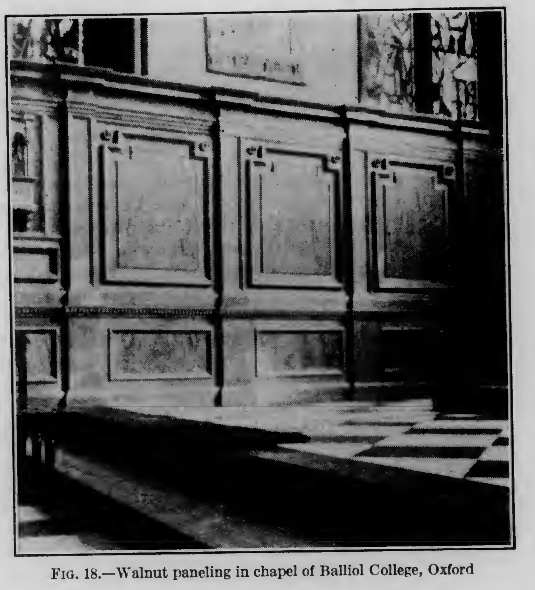


FIG. 18.—Walnut paneling in chapel of Balliol College, Oxford

SOURCES OF SUPPLY

The principal source of Great Britain's walnut needs is the United States, followed to a lesser extent by France. Small quantities are also received from West Africa. Formerly Italian and Black Sea (Circassian) walnut was imported, but these have practically ceased, the Italian imports being all imported in the form of veneer, while the Circassian is seldom used except for the manufacture of the stocks of expensive sporting guns. No statistics being available, it is impossible to give the total imports of this species into the United Kingdom.

In addition to the foreign, there is also a small quantity of native timber, but the quantity is so small that it is of little consequence in the walnut market.

United States.—Black walnut is imported from the United States, principally in the form of lumber. In addition, there are a few hewn and round logs brought into the west coast and Bristol Channel ports for conversion purposes, chiefly matched panels and veneers.

Only since 1922 have separate figures for this species been compiled in United States statistics, the exports of black walnut lumber from the United States to the United Kingdom during that period being as shown in the following statement:

	Feet, board measure
1922	2, 728, 000
1923	4, 000, 000
1924	5, 613, 000
1925	5, 557, 000
1926	3, 449, 000

As an export market for American black walnut lumber the United Kingdom is exceeded only by Canada, and during 1926 approximately 40 per cent of the total United States exports went to that country. It will be noted that exports show a sharp decline during 1926 as compared with the previous years. This must not be taken to mean that the American wood is losing favor but that the great arrears of work for those industries where walnut is principally used—i. e., telephone equipment and interior finish—had been caught up and the demand during 1926 was largely for current needs, as it will also be in the future.

Walnut lumber is imported from the United States in all grades and thicknesses, the first and second quality being used principally for panelwork and interior fittings. Other uses are telephone switchboards and equipment and electrical work generally, automobile steering wheels and dashboards, gunstocks, and airplane propellers. No. 1 and No. 2 common qualities are used principally for furniture, but during recent years the demand has fallen to very small proportions, brought about by two factors—one, the popularity of Jacobean or fumed oak; second, the question of price. Taking into consideration the first cost of the lumber itself and the extra expense of working it up as compared with oak, the finished article has been made too expensive for British users.

The United States is the only country shipping square-edged graded walnut lumber to the British market, a very desirable feature from the buyers' point of view, as the amount of waste is reduced to a minimum, whereas logs, whether solid or cut through and through, or unedged lumber imported from other countries entail considerable waste in conversion.

France.—French walnut is lighter in color than the United States variety, being a rich golden brown, the mineral streak also being less pronounced. It is also softer in texture, having a more open grain, and shipments received in the United Kingdom are often sappy and faulty. The export of uncut logs is prohibited by the French Government, while other descriptions are permitted to be exported under license only. It is imported into the United Kingdom chiefly as logs sawn through and through, each piece being replaced in its original position in the log, which is then bound with metal strapping so that the entire log is taken by the buyer. These logs are cut to any thickness desired by the buyer, peeled and steamed before shipment. An ordinary specification will run 10 to 20 inches in diameter at the small end, 4 to 12 feet long. During June, 1927, it was worth from 6d. to 10d. per superficial foot, according to quality. Some wany lumber is also imported cut from short butts 4 to 9 feet long in planks 4, 5, and 6 inches thick and 1-inch lumber cut from top logs. This latter is a strong competitor of the American No. 1 common grade and during June, 1927, was worth about 7s. 6d. and up per cubic foot c. i. f.

During the downward trend of the franc it was possible to import first-class French walnut logs into the United Kingdom at about 8s. 6d. to 11s. 6d. per cubic foot c. i. f., according to size and quality, as against 15s. to 20s. c. i. f., for similar logs from the United States. Lumber was also influenced by the same conditions, and as a consequence imports materially increased during that period.

The stabilization of the franc, however, has had a reverse effect; and consequently French walnut has greatly increased in cost to the British buyer and cut logs 18 inches and up, 10 to 20 feet in length, by June, 1927, were selling at 10s. to 12s. 6d. per cubic foot c. i. f.

French walnut is largely used for panelwork, piano cases, furniture, office and bank fittings, and veneer, it being preferred to any other variety for that purpose, while the wany planks imported are largely used for table legs and chairs and 1-inch stock for furniture work.

However, the total quantity of French walnut imported is comparatively small, and as the efforts of the Government of that country are to decrease rather than increase them, the United States will benefit most by any increase in demand for this species from Great Britain.

Africa.—African walnut has come much to the fore during recent years. It is imported from the Benin and Lagos districts of British Nigeria and also from the French Congo in the form of square hewn or round logs, chiefly the former. Shipments originating in Nigeria are sold as "Benin" walnut in the United Kingdom. This wood runs large, 20 to 40 inches and up deep, in the middle of the piece, being an average shipment, while the lengths run 10 to 18 feet.

It is harder in texture than either the American or French variety, and only occasionally is a little mineral stain found in it, and never any figure. Its low price and the large sizes in which it can be obtained, however, are important factors in its favor, and it is gaining in popularity with the British furniture industry. During June, 1927, the market was about 4½d. per foot board measure, c. i. f. London or Liverpool.

The principal ports of entry are London and Liverpool, where African walnut frequently appears in the catalogues of mahogany auctioneers and is sold along with that wood at the periodic sales, although many contracts are made on a c. i. f. basis.

Cape Lopez walnut shipped from the French Congo is not so much in favor with the British buyers as the Nigerian. Mineral stain is never found in it, but a little stripe figure is present in an occasional log. It has a soft and woolly nature which makes it hard to get a smooth finish. It also has a tendency to warp and soaks up polish. Specifications are about the same as the Nigerian, but it is worth about 1d. per foot board measure (c. i. f.) less on account of its undesirable qualties.

England.—Of the different varieties of walnut sold in Great Britain the home-grown is considered the richest in color and is much in demand for veneer, particularly those butts that show figure. It is, however, comparatively rare, only isolated trees being found scattered over the country, and it is doubtful if more than a few hundred reach the market during the year.

London is the principal market, it being the seat of the veneer industry, and in order that buyers can inspect them before purchasing the logs are shipped there, after which they are either cut into veneer or sawn into lumber at local sawmills, according to their suitability. When cut into veneer the slicing method is generally employed.

English walnut trees have a tendency to be stocky, with a number of limbs, so that only short lengths can be obtained as a rule. The usual lengths sold are 5 feet and up, or even shorter if a butt cut. In diameter the logs run from 14 to 30 inches, although the latter is exceptional. They are either bought from farmers who are willing to sacrifice an ornament on their property for its value in money, or where a country estate is being cleared for development the walnut is sold along with the other varieties of trees cut down.

The figured butts are used exclusively for sliced veneer, the others and top cuts of the logs being cut into lumber principally for tables and chairs. However, these figured butts are much in demand by America, and many of the selected ones are shipped to that country.

Occasionally trees are found having burls on them which furnish a particularly fine bird's-eye figured veneer, but they are now exceedingly rare and seldom found. When on the market burls are sold by weight and high prices are paid for them. During the early summer of 1927 walnut logs were selling for from 4s. to 8s. per cubic foot f. o. r. loading point, the price being determined by the size and figure.

MAPLE

Only hard or sugar maple finds a market in the United Kingdom, there being no demand for the soft variety. Hard maple is imported from both the United States and Canada, and although a small quantity of West Virginia stock is used the bulk from the United States originates in Michigan and Wisconsin. The wood from these States, owing to climatic conditions, being of a very high quality in hardness, texture, and strength, is preferred, and it is frequently called "rock maple" in the British lumber trade because of its hardness.

The largest demand for maple is in the form of flooring, either in strips or blocks, full particulars of which are given in the section on "Planing-mill products."

Lumber is imported rough sawn in both prime and select qualities in specifications 1 to 3 inches thick by 6 inches and wider. Small quantities of prime strips, 1 and 1¼ by 4, 4½, and 5 inches, 6 feet long and up, averaging 11 feet, are also imported for the manufacture of flooring in local factories.

Maple rails for piano actions are generally imported ready-made in pairs, the specification calling for 1 piece each 1 by 3½ inches and 1¼ by 2½ inches, 75 per cent to be 49 inches and 25 per cent 51 inches long. This stock must be absolutely clear of all defects and cut to exact size, otherwise it is unsuitable for the purpose for which it is intended and is rejected on arrival.

Its qualities of hardness, strength, closeness of grain, freedom from shrinkage, and ability to take a high polish makes hard maple particularly suitable where these properties are desired, but its higher cost as compared with other species, although not comparable with hard maple in the qualities named, restricts its use to purposes where they are essential and price a secondary consideration.

The uses of hard maple are extremely varied and while no particular industry consumes a large quantity the aggregate reaches a fair volume each year.

Until recent years, one of the most important outlets was the automobile industry for body framework, but with the development of the cheaper type of car on a mass-production scale it has been replaced by European beech, which is sold at a much lower price, so that the demand for hard maple from this industry has dropped to very small proportions.

The peculiar quality of resonance possessed in such a high degree by this species, in conjunction with its other properties of strength and freedom from resin, has made it particularly suitable for the manufacture of musical instruments, of which the most important is high-class pianos. Specially selected white (sapwood) winter-sawn, end-dried lumber only is used, the greatest care being taken to see that it is thoroughly dry before cutting it into the parts for which it is intended.

Butchers' tables and chopping blocks are generally made out of hard maple, the latter being constructed from 2, 2½, and 3 inch planks cut down to 12-inch lengths, edged and glued together. No other wood has been found to stand the hard treatment these blocks receive.

For laundry appliances hard maple is also extensively used, particularly for the rollers of mangles or wringing machines. These are imported cut to the required size in octagonal blocks out of quarter-sawn wood and turned after seasoning.

For textile machines having wooden parts, telephone equipment, mallets, warehouse and other small trucks, pulleys, brush backs, gymnasium apparatus, shoe-trees, billiard cues, and hubs of electric cable drums hard maple is extensively used.

A new use for hard maple has recently been developed in London, where it is being used for the treads of subway escalators. The heavy wear caused by the many hundreds and thousands of people who daily use these at busy stations necessitated the use of a material that would stand up under all conditions, and, after exhaustive experiments, American hard maple was chosen. Not only did it last longer than when composition was used, but it had the added advantages of not wearing smooth and becoming slippery when wet, a dangerous factor on a moving staircase. These floors are made by laying narrow strips on a subfloor at right angles to the riser in corrugated form, which not only prevents the accumulation of pools of water during wet weather but also enables worn patches to be speedily and economically repaired. These strips are fastened to the subfloor with brass-headed screws and are slightly beveled on each edge so that they will fit into the apertures of the steel comblike alighting floor at each end of the escalator.

Both plain and bird's-eye logs are occasionally asked for by veneer manufactures, but their requirements are such that business seldom results.

BIRCH

Large quantities of birch are imported by the United Kingdom, the greatest part coming from Canada. Next in importance as a source of supply is Finland, and, in addition, small quantities are received from other European countries, such as Latvia, Russia, Sweden, Poland, and Austria, as well as the United States, but the total is so small that it is not a serious factor in the birch market. The principal ports of entry for birch are Liverpool, Manchester, Garston, Avonmouth, and Glasgow on the west coast, and London and Hull on the east coast, with occasional shipments to the outports.

Birch is imported in the form of rough-sawn lumber, hewn logs, and squares and, in addition, considerable quantities of white birch spool wood, or small squares out of which the bobbins required by the textile manufacturers are made. Spool wood enters principally through the ports of Hull, Glasgow, and Manchester from Finland and Canada and is distributed from them throughout the surrounding textile districts.

In former years large quantities of squares for the furniture trade were imported, but the quantity has now dwindled to very small proportions because they can not be sold in competition with the stock cut locally from logs.

PRINCIPAL SOURCES AND USES

Canada.—Birch is the chief Canadian hardwood imported into the United Kingdom. It is divided into two classes by the lumber trade, being sold either as "Quebec" or "lower port." The Quebec variety originates in the Province of that name and is of excellent texture. It is shipped through the ports of Quebec and Montreal when the St. Lawrence is open for navigation, while, during the winter season when that river is icebound, it is shipped from St. John, New Brunswick. The "lower port" variety of birch originates in the Provinces of New Brunswick and Nova Scotia, St. John and Halifax being the chief ports of shipment, and is of an inferior texture to the Quebec. Canadian birch is imported in the form of lumber, wany hewn logs, and round logs with bark on, these latter being specially selected for veneering purposes.

During the past few years there have also been imported fairly large quantities of Canadian white birch spool wood by a large firm of sewing-thread manufacturers in Scotland who formerly obtained their supplies from Finland. Birch lumber is imported cut to all thicknesses, 1 to 4 inches by 4 inches and wider. The lengths of Quebec stocks are generally 8 feet and longer, while shipments from the lower ports are 9 feet and longer and include some 4 to 8 feet ends. Quebec shipments are graded into two qualities, "prime" and "merchantable," but very little of the former is imported, the bulk being "merchantable." The Quebec "merchantable" lumber is square edge and bright. During the early summer of 1927 the market value was approximately £26 per standard c. i. f.

Lower port birch is usually imported 2 inches and thicker and in "unsorted" quality only. It does not compare in grading or manufacture with the Quebec variety, being much knottier and having considerable wane. As a consequence, it has much less value, the market price in the early summer of 1927 being about £16 10s. per standard c. i. f. for the Halifax, and slightly more for the St. John. However, shipments of the Quebec variety are decreasing, most of the supplies now being received coming from New Brunswick and Nova Scotia.

Hewn birch logs are not square but have a heavy wane left on each edge. Those from the lower ports are usually sold on a 14 to 15 inch average quarter girth, taken in the middle of the piece, and are from 8 to 16 feet long.

Quebec logs, on the other hand, are of greater girth than the lower port and are usually sold on an average of 16 inches with an increase of 1½d. per cubic foot for each ½ inch in average girth. Lower port logs are not as straight or as well manufactured as the Quebec and have a heavier wane on them as a rule.

During the early summer of 1927, the market value of hewn birch logs was as follows: Quebec 16-inch average, 4s. to 4s. 3d. per cubic foot, Hoppus string measure, c. i. f.; lower port, 14 to 15 inch average, 2s. 9d. to 3s. per cubic foot, Hoppus string measure, c. i. f.

The chief outlet for birch is the furniture industry, which uses it principally for chair seats, frames of upholstered chairs and sofas, and table legs; it is also extensively used for toilet seats stained a mahogany finish. The fact that it wears well, is cheap and easily stained to resemble the more expensive furniture woods, such as mahogany, is greatly in its favor. The automobile industry also uses a small quantity for body framework, but other species are preferred. The lower port stocks are used for the same purposes; but, in addition, large quantities are consumed for the manufacture of tin-plate boxes in the South Wales district during normal times. Other uses are for brushes, babies' cots, and garden furniture. The logs are converted into lumber or dimension and used for the same purposes as the lumber.

It is interesting to note that a special use has been developed for birch plywood during recent years in the construction of airplanes, very large stitched sheets being used for the fuselage.

Although Finland and other north European countries supply this market with great quantities of birch plywood each year, this variety has not been found suitable for fuselage work. The Canadian logs are therefore imported and the plywood manufactured in the United Kingdom.

Finland.—Although there are plentiful supplies of birch in Finland, it has been found more profitable in that country to convert its timber into plywood rather than to export it in an unmanufactured condition. As a consequence, the lumber imported by the United Kingdom consists almost entirely of special items, such as spool wood, putlogs, and squares, and of these the two former compose the major portion.

Although much of the spool-wood business is now going to Canada, considerable white birch spool wood for thread spools or bobbins is still furnished by Finland. It is imported in the form of small squares—⅞ by ⅞ to 2 by 2 inches, rising by ⅛ inch, a usual specification calling for 70 per cent 4 feet, 30 per cent 2, 2½, 3, and 3½ feet long, in 6-inch multiples. The price for this stock has fallen considerably during the past few years, and early in 1927 the market was about £15 c. i. f. Hull, the principal port of entry, others being Manchester and Glasgow. The chief difficulties regarding this business are the extreme accuracy required as to size and high quality of the wood furnished, which must be clear of all defects, as otherwise it is useless for bobbin purposes. The squares are imported in bundles of uniform sizes, the number contained in each depending upon the size of the square.

Finland also furnishes the chair manufacturers of the United Kingdom with birch squares, but the quantity is of small proportions. The sizes generally used by the chair-making industry, which is centered at High Wycombe, are 1½ by 1½ by 27 inches, 2¼ by 2¼ by 17 inches, 2½ by 2½ by 11 inches, and 4 by 4 by 9 inches.

Birch putlogs are small hewn squares used in scaffolding to support the floors on which the men working on the outside of the building stand. They are set at right angles to the building, one end resting in a hole purposely left in the wall, the other being bound to either the upright or cross section of the scaffold poles. They are imported chiefly from Finland and Sweden, with a few from Russia. The usual dimension is 6 feet 3 inches by 3 inches, and during the early summer of 1927 the value was approximately 7s. per dozen, c. i. f. London, which is the principal market for them, few being used in other parts of the country.

BASSWOOD

Both American and Canadian basswood is used in the United Kingdom, but the former is preferred on account of its being considered whiter, and it therefore fetches a slightly higher price.

The principal demand is for piano stock, which is always described as such when ordered, 1 by 4 inches and wider, 8 to 16 feet long. This lumber must be winter-sawn and strictly white, and is used chiefly for making piano keys. Other basswood, which need not be so white, is used to some extent for piano tops and ends.

There is also a demand for regular first and second quality lumber dressed two sides to ⅞ inch, which is used in place of yellow poplar, on account of its lower value for tops of kitchen tables and covers of wringing machines.

Some basswood round logs are occasionally imported and cut up for the same purposes mentioned above.

HICKORY

Most of the hickory used in the United Kingdom is imported from the southern States of the United States in the form of round logs with the bark on, although an occasional car of lumber 1¼, 1½, and 2 inches thick, No. 1 or 2 common and better quality, is also brought in. While the figures of the United States customs show 1,060,000 feet, board measure, of hickory lumber as having been exported to the United Kingdom during 1926, it is doubtful if this is correct, it being probable that the greater part consists of squares and should more properly be included under the heading of "Small-dimension stock."

Hickory logs destined for the United Kingdom should be felled during the fall and winter months only, otherwise there is danger of worms getting in them and their being rejected on arrival. The usual specification called for is 10 inches and up in diameter at the small end, 10 feet and up long; but smaller logs are not objected to provided they run largely to white or sap wood, which, unlike most other species, is greatly preferred to the hardwood which has a reddish color.

Hickory logs are sold either ex quay or c. i. f., based on Hoppus or Liverpool string measure, for details of which see section on "Measurement of timber, lumber, and round logs."

Hickory has great strength, tenacity, and elasticity and possesses the property of returning to its original position after being put under a strain.

These qualities make it admirably suited for such purposes as hammer, ax, and pick handles, golf shafts, railway shunting poles, and picker sticks in textiles mills, and it is for the manufacture of these that hickory is chiefly used in the United Kingdom.

MAGNOLIA

During the past few years the use of magnolia has considerably increased in the United Kingdom. Its freedom from defects and its moderate price compared with other species have been favorable factors in its increased use.

It is imported chiefly in first and second quality, 1, 1¼, 1½, and 2 by 6 inches and wider, while 1 by 12 inches and wider is a favorite specification. Small quantities of No. 1 common and selects quality are also imported.

Magnolia is used principally in the automobile industry and for interior finish of dwellings, also to some extent for picture moldings, while the wide stock finds an outlet for facia or signboards on store fronts.

TUPELO

This species, sold as bay poplar, tupelo, or white gum, is gaining in favor with the furniture industry in the United Kingdom, and although no official import figures are available it is the opinion of those in the trade that imports are increasing. Both first and second and No.1 common and selects grades are in demand in ½, ⅝, ¾, and 1 inch, the thin stock usually being dressed two sides to the thickness indicated.

Tupelo is chiefly used for sides and backs of drawers, its moderate price having been a large factor in promoting its use for this purpose.

The most frequent complaint made against this species is that of being warped and twisted, and care should be taken to see that only flat lumber is shipped to this market.

CHESTNUT

This species is largely imported into the United Kingdom in the grade of sound wormy, dressed two sides to ⅝ and ¾ inch thick. Most of it is used for plywood cores, which are faced with the more expensive hardwoods. This plywood is used chiefly for the manufacture of talking-machine cabinets.

Chestnut is also used to some extent as a substitute for oak in the furniture trade.

During 1926, exports of this species from the United States to the United Kingdom were 2,134,000 feet board measure, but it is doubtful if any increase can be anticipated at its present value.

COTTONWOOD

No official figures are available as to the quantity of cottonwood imported by the United Kingdom, but it is small. The principal demand is for first and second quality, dressed two sides to ⅞ inch either 13 to 17 inches or 18 inches and wider, mostly the latter.

Scotland is the chief market, where it is used for the manufacture of kitchen dresser tops. Its woolly texture prevents a smooth finish from being obtained, and its tendency to soak up stain limits its use to a very few purposes.

BEECH

American beech is unknown in the British market, its cost, as compared with other varieties, making its use prohibitive.

Most of the beech used in the United Kingdom comes from the central European countries of Czechoslovakia, Yugoslavia, and Rumania; in addition, smaller quantities are received from Poland through Danzig, France, and Russia, but of these Czechoslovakia is the most important. For selling purposes, central European beech is frequently grouped together and sold as "continental," while at other times it is designated by the country of origin, especially that originating in Yugoslavia (which is called Austrian) or in Poland or France. The Carpathian, however, is superior to the others, and for this variety a distinction is always made. There is no definite agreement in the lumber trade on this matter, each individual importer using the description he considers most suitable. European beech does not store well, and when exposed to the weather soon begins to show dote. Owing to the variation in quality, grade, and condition, few British importers will contract for forward delivery except subject to inspection on arrival.

Beech is imported both air-dried and steamed in edged and unedged lumber and squares. Prime quality (90 per cent free of all defects) only is marketed for the reason that the defects, principally black knots and dote, are of such a character that their presence reduces the lumber practically to culls. Very wide widths are obtainable in the unedged lumber, and for this reason it is particularly desirable for the manufacture of furniture.

All thicknesses 1 to 4 by 6 inches and wider, averaging about 8½ inches wide, in lengths of 6 feet and longer are sold, and during the summer of 1927 the market value was approximately 3s. 6d. per cubic foot, c. i. f. regular United Kingdom ports.

The Carpathian red beech which comes from the Czechoslovak district of Rusinia, is, however, much superior to the other European varieties and brings a premium of about 6d. per cubic foot over shipments from other European countries. It is shipped overland to Hamburg and thence by water to the United Kingdom.

Owing to its very moderate price as compared with other suitable species, European beech has made considerable headway in the United Kingdom during the past few years, and particularly in the automobile industry has it largely replaced other woods for body-building work. It is, however, perhaps for the manufacture of chairs and the less expensive furniture that beech has made the most progress, where it is usually stained to the fashionable colors of the moment.

Other uses for beech in this market are for bobbins, heels of ladies' shoes, clog soles, brushes, and small woodenware.

ELM

Canada supplies most of the elm imported by the United Kingdom. It is of two varieties—the hard, or "rock," and soft, or "gray," elm.

Rock elm comes in the form of hewn timber and round logs with the bark on; an average specification of the latter will run from 20 to 40 feet long, 14 inches and up in diameter at the small end, averaging 18 inches. It is exceedingly tough and is used mainly for dock and wharf construction in places which come in contact with vessels, such as the edges of wharfs and landing stages. Ferry and excursion vessels usually have a belt of elm to act as a fender, as it will wear smooth and not fray. Elm is of particular value for use in places that are exposed to moisture, as it does not rot easily. It also enters largely into the construction of ships' lifeboats.

Gray elm is imported generally as lumber 1 by 12 inches and wider and is used almost exclusively for coffins.

Elm is one of the most common native timbers and is dealt with under the section "Native lumber industry."

PHILIPPINE HARDWOODS

With the exception of the lauans and tanguile, which have been covered under mahogany, the only other Philippine hardwood that has gained a market in the United Kingdom is apitong. The demand for this species is steadily developing, its close texture and great strength combined with its moderate price making it desirable where these qualities are required. Its principal use is for the underframing of railway freight cars, the long lengths in which it can be obtained, combined with its other qualities, making it very desirable for this purpose. Small quantities are also used for construction work and also for flooring, being imported in strips and manufactured in local factories.

SPANISH CEDAR

There is only a limited demand for Spanish cedar in the United Kingdom, its uses being restricted to very few purposes. No official records of the amount imported are available; but according to figures compiled by brokers interested in its sale, the import during 1926 amounted to 250,000 feet board measure into London, and 94,000 feet into Liverpool, the two principal ports of entry. Spanish cedar is generally included with shipments of mahogany logs and is usually sold at public auction along with them, although sales are occasionally made by private contract.

British Honduras and Nicaragua are the principal sources of supply, with small quantities from Tabasco (Mexico), Costa Rica, and Cuba. Timber from British Honduras, Tabasco, and Costa Rica is usually square hewn, this being preferred; a small quantity of round logs are also received from these countries. Nicaraguan is usually imported in round logs, while Cuban cedar is almost always square hewn. There are rarely any imports of lumber.

All these have a characteristic pleasant odor, and are of a mild texture, easy to work and free from resin. The Honduras and Nicaraguan stock furnishes the larger sizes, the others, particularly the Cuban, generally being of small dimensions.

The following is the range of sizes and lengths received in an average shipment of Spanish cedar from the countries mentioned: Honduras and Tabasco—12 to 28 feet long, 20 to 40 inches square, round logs same length, 24 to 48 inches diameter; Nicaraguan—12 to 28 feet long, 24 to 48 inches diameter; Cuban—10 to 18 feet long, 10 to 24 inches square.

During June, 1927, the approximate value per foot board measure, ex broker's yard, was as follows: Honduran, 8d. to 1s.; Nicaraguan, 8d. to 10d; Tabasco, 8d. to 10d.; Cuban, 8d. to 10d.

Sale measure, in the case of hewn timber, is the extreme contents of the piece after deducting any allowance for defects, and round logs are measured according to Liverpool string or "Hoppus" system, depending upon the city in which the stock is being sold.

The principal use of Spanish cedar is for racing shells, rowboats, punts, and other pleasure river craft, and for cigar boxes. A very small quantity is also used for high-class furniture.

The trade, however, has declined in recent years, the cigar-box trade, which formerly used the bulk of the imports, being greatly reduced and now of very small proportions.

BORNEO CEDAR

Small parcels of Borneo cedar are occasionally received in the United Kingdom on order in the form of hewn timber, round logs, sawn squares, and rough lumber, the specifications running about as follows: Timber, 18 to 36 feet long, 24 to 36 inches square; logs, same lengths, 30 to 40 inches diameter; sawn squares, in lengths of 18 feet and up, 3 by 3, 4 by 4, 5 by 5, and 6 by 6 inches, etc.; lumber, 3 inches thick and up, in widths of 8 inches and up, 18 to 26 feet long.

Borneo cedar is quite unlike Spanish cedar; it is light red in color and possesses considerable strength. Its principal uses are for the construction of railway cars and, to a smaller extent, in the furniture trade as a substitute for mahogany.

PENCIL CEDAR

Over 95 per cent of the cedar used for the manufacture of pencils in the United Kingdom is imported from the United States and is either aromatic red cedar (*Juniperus virginiana*) or incense cedar (*Libocedrus decurrens*), the former predominating. Practically all of it is imported in the form of slats in dimensions of 185 by 55 by 5 millimeters (7¼ by 2¼ by $\frac{3}{16}$ inches) and proportionately narrower widths. Shipments of red cedar slats from the eastern seaboard of the United States are usually packed in cases, each containing the equivalent for 100 gross of pencils, while incense cedar slats from the Pacific coast are packed in various kinds and sizes of containers, bags, cartons, and cases all being used.

A small quantity of pencil-cedar slats are also received from Kenya, East Africa, but difficulties are being met with in regard to manufacture and drying in that country, so that up to the present time the quantity exported has been comparatively small. Kenya cedar, however, according to a leading pencil manufacturer, is a very good substitute for the American varieties, and these difficulties will doubtless be overcome as the industry develops and an increasing proportion of the British pencil wood will be obtained from this source.

Closet lining.—Efforts have been made to introduce aromatic red cedar closet lining into the United Kingdom but, although moths are extremely prevalent, little success has been met with so far, the public preferring to use one of the many preparations obtainable at little cost at any drug store. Another, and perhaps the principal, reason for lack of success, however, is probably because built-in closets are not usual in British homes, wardrobes being generally used and included in every set of bedroom furniture, so that compared with the United States the field is a comparatively small one.

GREENHEART

The United Kingdom gets its supplies of greenheart from British Guiana, most shipments being made from Georgetown.

It is a hard, dense wood, having a peculiar yellow-green color, and is imported entirely in square hewn timber—a usual specification being 12 by 12 inches and up, in lengths 20 feet and longer, averaging 50 to 60 feet. The wood is considered poisonous, cases of blood poisoning having been caused through splinters entering the flesh of those working it.

Greenheart is used for dock and wharf piling and decking and dock gates, because it contains an oil which enables it to resist attacks of the teredo. Since the war, however, its use has been largely discontinued in many parts of the country, having been replaced by concrete and steel.

Liverpool is the principal market and during 1926 imports to that district amounted to 115,000 cubic feet, while consumption was only 61,000 cubic feet. During the same year the London imports amounted to 3,900 cubic feet, while the consumption was only 2,550 cubic feet.

AUSTRALIAN AND NEW ZEALAND HARDWOODS

Australia.—Jarrah and Western Australian karri, or blue gum, are the principal woods imported into the United Kingdom from Australia. During 1925, according to official statistics, imports of unmanufactured wood from Australia which, with the exception of a very small quantity of fancy woods used for panel work, consisted almost entirely of jarrah and karri, were as follows: Round and hewn hardwood, 3,800 cubic feet, valued at £1,080; sawn hardwood, 1,129,217 cubic feet, valued at £274,572; and ties, 1,238 loads, valued at £13,937.

Jarrah is an exceedingly dense wood weighing about 65 pounds to the cubic foot when dry. It is very durable in water, or where exposed to constant dampness, and is strongly resistant to fire. Karri has similar qualities to jarrah but is slightly heavier. Both jarrah and karri are used for similar purposes, the principal one being for railroad car construction where they are being used to an increasing extent and competing strongly with American northern white oak.

Karri is also used for telegraph pole arms, the principal sizes used being 2½ by 2½ inches and 3 by 2½ inches, 3 feet 6 inches, 4 feet, and 6 feet 6 inches long.

Jarrah is sometimes used combined with oak in wood block floors, its dark, reddish-brown color making a pleasing contrast with the lighter wood. Formerly this species was used for dock piling, but since the export of unmanufactured timber has been prohibited by the Australian Government long lengths of hewn timber for piling have not been available. For purposes such as decking and underframing of piers or jetties where long lengths are not necessary, however, it is still used to some extent. On account of their durability karri and jarrah at one time were considerably used for street paving, but of recent years they have practically been discontinued, being replaced by the less expensive treated block of north European pine. For details regarding ties see the section under that heading.

New Zealand.—Kauri pine (*Dammara australis*) is the best-known New Zealand wood sold in the United Kingdom, but with its gradual disappearance imports have dwindled to such very small proportions that it has become almost a curiosity. It has a fine, medium-hard texture and is generally imported in heavy clear planks of wide widths which are used principally for panelwork in passenger vessels and railroad cars, also for vats.

Ilimo or New Zealand white cedar is occasionally imported in round logs, the sizes of which run from 10 to 16 feet long, 24 to 40 inches in diameter. During June, 1927, a small parcel of these was offered by auction in London and sold for 8s. per cubic foot ex yard.

During the past few years efforts have been made to popularize the use of Tasmania oak and other hardwoods but they are still in the experimental stage and of little importance in the British hardwood market.

OTHER HARDWOODS

Obeche or African whitewood.—Imports of this species into the United Kingdom are increasing although the total is still comparatively small. The advancing value of okoumé is furthering the use of obeche as a substitute. Obeche is shipped from the west coast of Africa in the form of square hewn timber, which weighs about 36 to 38 pounds to the cubic foot. It runs large in size, an average shipment recently received being 20 to 55 inches deep in the middle of the piece, with an average of over 30 inches, and in length from 10 to 20 feet. The timber is imported clear of knots, is mild in texture and easy to work, but has a woolly nature and for that reason will not take a polish. The principal defects are ring shakes and "punky" hearts, the full extent of which does not become apparent until the timber is opened up. It is a comparatively cheap wood, recent sales having been made at 3d. per foot board measure, c. i. f. London. On account of its nature it is unsuitable for veneer, its principal use so far having been as a base on which veneers of fancy hardwoods are applied. The logs are cut into lumber, ½, ¾, and 1 inch thick and are piled for about four months for seasoning before use.

Although the name "whitewood" is also used in the British lumber trade to indicate American poplar, there is little similarity between it and this African species and in no circumstances could it be used as a substitute.

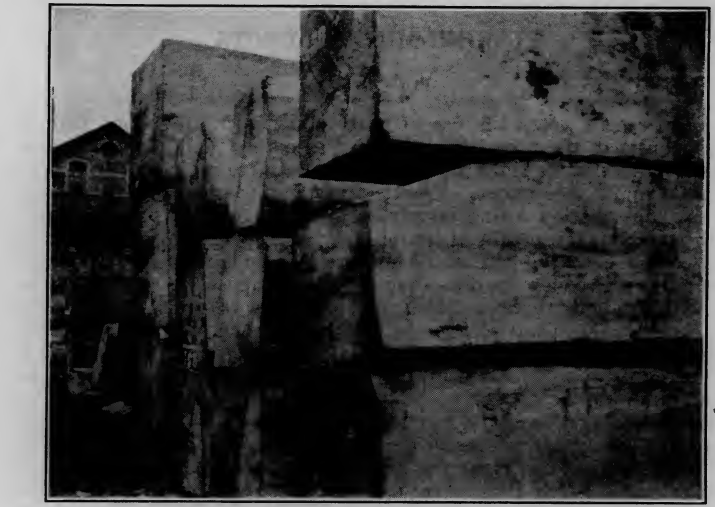


FIG. 19.—Obeche or African whitewood hewn timber. An average depth of over 30 inches is not unusual

Dogwood and persimmon.—Considerable quantities of these woods are used for the manufacture of shuttles for the textile mills of Lancashire and Yorkshire, also for heads of golf sticks. However, during recent years the business has passed almost entirely into the hands of American firms who make a specialty of cutting the rough blocks, and imports of logs have practically ceased.

Jarrah is an exceedingly dense wood weighing about 65 pounds to the cubic foot when dry. It is very durable in water, or where exposed to constant dampness, and is strongly resistant to fire. Karri has similar qualities to jarrah but is slightly heavier. Both jarrah and karri are used for similar purposes, the principal one being for railroad car construction where they are being used to an increasing extent and competing strongly with American northern white oak.

Karri is also used for telegraph pole arms, the principal sizes used being 2½ by 2½ inches and 3 by 2½ inches, 3 feet 6 inches, 4 feet, and 6 feet 6 inches long.

Jarrah is sometimes used combined with oak in wood block floors, its dark, reddish-brown color making a pleasing contrast with the lighter wood. Formerly this species was used for dock piling, but since the export of unmanufactured timber has been prohibited by the Australian Government long lengths of hewn timber for piling have not been available. For purposes such as decking and underframing of piers or jetties where long lengths are not necessary, however, it is still used to some extent. On account of their durability karri and jarrah at one time were considerably used for street paving, but of recent years they have practically been discontinued, being replaced by the less expensive treated block of north European pine. For details regarding ties see the section under that heading.

New Zealand.—Kauri pine (*Dammara australis*) is the best-known New Zealand wood sold in the United Kingdom, but with its gradual disappearance imports have dwindled to such very small proportions that it has become almost a curiosity. It has a fine, medium-hard texture and is generally imported in heavy clear planks of wide widths which are used principally for panelwork in passenger vessels and railroad cars, also for vats.

Ilimo or New Zealand white cedar is occasionally imported in round logs, the sizes of which run from 10 to 16 feet long, 24 to 40 inches in diameter. During June, 1927, a small parcel of these was offered by auction in London and sold for 8s. per cubic foot ex yard.

During the past few years efforts have been made to popularize the use of Tasmania oak and other hardwoods but they are still in the experimental stage and of little importance in the British hardwood market.

OTHER HARDWOODS

Obeche or African whitewood.—Imports of this species into the United Kingdom are increasing although the total is still comparatively small. The advancing value of okoumé is furthering the use of obeche as a substitute. Obeche is shipped from the west coast of Africa in the form of square hewn timber, which weighs about 36 to 38 pounds to the cubic foot. It runs large in size, an average shipment recently received being 20 to 55 inches deep in the middle of the piece, with an average of over 30 inches, and in length from 10 to 20 feet. The timber is imported clear of knots, is mild in texture and easy to work, but has a woolly nature and for that reason will not take a polish. The principal defects are ring shakes and "punky" hearts, the full extent of which does not become apparent until the timber is opened up. It is a comparatively cheap wood, recent sales having been made at 3d. per foot board measure, c. i. f. London. On account of its nature it is unsuitable for veneer, its principal use so far having been as a base on which veneers of fancy hardwoods are applied. The logs are cut into lumber, ½, ¾, and 1 inch thick and are piled for about four months for seasoning before use.

Although the name "whitewood" is also used in the British lumber trade to indicate American poplar, there is little similarity between it and this African species and in no circumstances could it be used as a substitute.

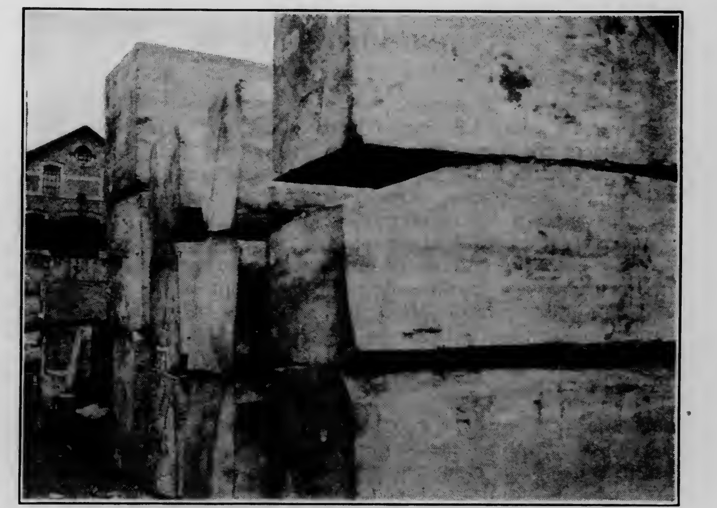


FIG. 19.—Obeche or African whitewood hewn timber. An average depth of over 30 inches is not unusual

Dogwood and persimmon.—Considerable quantities of these woods are used for the manufacture of shuttles for the textile mills of Lancashire and Yorkshire, also for heads of golf sticks. However, during recent years the business has passed almost entirely into the hands of American firms who make a specialty of cutting the rough blocks, and imports of logs have practically ceased.

PLANING-MILL PRODUCTS

FLOORING

Until recent years the use of hardwood flooring in Great Britain was confined to department stores, assembly halls, auditoriums, dance halls, skating rinks, banks, office buildings, and the more expensive type of residences. Practically none was used in ordinary house construction owing largely to the fact that, in pre-war days, comparatively few people of the middle classes owned their own homes, fully 90 per cent living in rented houses. These houses were naturally erected with a view to obtaining the largest possible return on the investment and, therefore, the great majority of them were floored with north European softwoods, which were the cheapest available species. These floors were usually laid in face widths of 5½ and 6 inches and, in some cases even wider, to reduce the laying cost to the minimum.

Since the war, however, economic conditions in the housing industry have forced a much larger proportion of the middle classes to buy or build homes, but even yet high taxation and postwar prices are compelling the building of such homes to be at the lowest possible cost so that the development of the hardwood floor, which must naturally follow the individuals' interest in their own purchased home (as distinct from one that is rented) has not progressed as it might have done in less difficult times. Builders erecting dwellings for speculative purposes are now finding it an excellent selling point for the less expensive type of house.

The difficult problem of securing domestic help is also forcing greater consideration to labor-saving aids in the home and, while floors of ordinary European softwoods must be covered with either carpets or linoleum, small rugs which can be easily taken up and cleaned are all that is necessary where there is a hardwood floor.

KINDS AND SOURCES OF SUPPLY

The principal demand in Great Britain is for spruce and pine flooring, known as whitewood and redwood in the British lumber trade, which is imported in a finished state largely from Sweden and Norway, although of late years small quantities have been brought in from Finland and Latvia, but the quantity so far has remained of small volume. There is also a certain amount manufactured in custom mills in Great Britain out of rough lumber imported from northern Europe. The imports of flooring into Great Britain during the year 1925 are shown in the table on the following page.

Country	Quantity	Value
	Loads	
Sweden	248,107	£1,462,025
Norway	135,519	807,826
Finland	13,572	74,143
Latvia	7,659	47,078
United States	3,985	54,375
All other	4,777	35,975
Total	413,619	2,481,422

NOTE.—Load equals 600 feet board measure. During 1925 the average rate of exchange was $4.83 to the pound sterling.

European softwoods.—While both spruce and pine flooring are used in the United Kingdom certain sections prefer spruce and others pine. Broadly speaking, the south and southeast prefer pine flooring, while the west, northwest, and Scotland prefer spruce. Only flat-grain stock is available owing to the timber in the producing countries not being large enough for edge grain. The lumber contains a large quantity of tight knots but, as the floors are seldom exposed to view, this is not considered any defect. Practically all north European softwood flooring in imported in "unsorted" quality, a grade combining firsts, seconds, and thirds, although there are still a few Swedish exporters who ship a second and third quality combining 60 per cent seconds and 40 per cent thirds.

There is no discrimination made in the British trade between Swedish and Norwegian stock and both sell for approximately the same price, as they are considered equal in manufacture and grading. During April, 1927, the market price for an average specification of flooring and matchings was £17 per standard of 1,980 superficial feet, c. i. f., on the basis of 1 by 6½ and 7 inches, square edge. This was based on an ocean freight rate of 52s. 6d. per standard.

During the winter months, most of the Swedish lumber ports are closed to navigation owing to their being icebound, so that Norway, with its ice-free ports, has the advantage of being able to make shipments during that period and naturally does not fail to make the most of the opportunities for selling while free from Swedish competition. Norway also is in a favorable position for selling small liner parcels, whereas many of Sweden's lumber mills, not being located near liner ports, are limited to shipping in vessels especially chartered to lift full cargoes of lumber.

Flooring is always imported thoroughly seasoned and in condition for immediate use. Both tongue and groove and square-edge lumber is used, the lengths of which run from 6 to 24 feet, although very few are over 20 feet. Lengths of 6 to 8 feet, called "ends," are used for ships' stowage and sell for two-thirds the price of the 9-foot and longer lengths. Contracts usually limit the quantity of ends to that required for broken stowage only, not exceeding 5 per cent of the total shipment.

While Swedish and other north European softwood flooring is bought on individual prices for each item after negotiation, Norway has for many years used a "base" price list, that in use at present being as follows: Square edge—1 by 4 inches, 20s. less than base; 1 by 4½ and 5 inches, 10s. less than base; 1 by 5½ and 6 inches, 5s. less than base; 1 by 6½ and 7 inches, base. Tongue and groove—all sizes, 5s. more than square edge for both pine and spruce. For ¾ inch thick there is added 10s.; for ⅝ inch, 20s.; and for ½ inch, 40s.; to the price for 1-inch stock.

The unit of sale is the Petrograd standard of 1,980 feet board measure, the measurement being based on the nominal size of the boards, the actual being ¼ inch in width, ⅛ inch less in thickness. Thin stock, however, that is, stock under 1 inch nominal thickness, is not considered as 1 inch as in American trade practice for invoicing purposes, and the contents are based on board measure calculated from the nominal sizes. In other words, ½ inch nominal lumber is considered to contain exactly one-half the number of feet of 1 inch.

Importance of shippers' brands.—The brands of the principal shippers of both Swedish and Norwegian flooring are well known in the British market and sales are frequently made on the brand rather than the shipper's name. Shippers who, through careful grading and conditioning, have built up a reputation, naturally command better prices for their stock than others, likewise when business is dull they get the preference on such orders as are being placed. Such reliance is placed in these brands that importers frequently advertise them as a guarantee of the excellence of the stock they are offering.

Southern pine.—Southern or pitch pine flooring is used to a small extent in residences, public buildings, and offices, mostly edge grain.

The flooring is not imported ready-made but manufactured out of sawn timber in local sawmills, the principal sizes being 1 by 3, 4, and 4½ inches nominal, finished to ¼ inch in width and ⅛ inch less in thickness, in lengths of 16 feet and up. A favorite pattern for this domestic flooring is tongue and groove prepared for secret nailing.

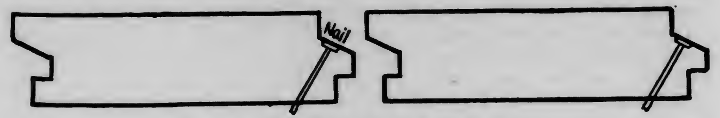


Fig. 20.—Flooring prepared for secret nailing

Owing to the limited demand there is no difficulty in getting all the flooring required out of timber so that there has never been any call for its importation from America ready manufactured. Even that demand is being reduced by the growing popularity of block flooring.

American oak.—Practically all the oak flooring imported ready manufactured into the United Kingdom comes from the United States, and its low price, as compared with Austrian oak, heretofore most generally used, has been a great factor in educating the British public to the fact that hardwood floors are not a luxury to be enjoyed only in the homes of the wealthy but are available also to those having only moderate means.

Both the northern and southern variety of American white oak flooring is used in clear quartered, clear plain, select plain, and No. 1 common (quartered and plain sawn mixed) qualities, the principal sizes being as follows: 1 by 3 inches finished to $\frac{13}{16}$ by 2¼ inches and ½ by 2½ inches finished to ⅜ by 2 inches, and to a smaller extent 1 by 4 inches finished to $\frac{13}{16}$ by 3¼ inches. The usual lengths run from 2 to 16 feet, with an average of 5 feet, and the boards are tongued and grooved, end matched, and hollow backed.

In laying oak flooring the usual procedure is to lay $\frac{13}{16}$-inch strips direct on the floor joists although, in many cases, it is laid on a subfloor, particularly in public buildings where the wear is heavy. The thinner ⅜-inch stock, however, must be laid on a subfloor, which is generally inexpensive European softwood, so that it is most economical for use in old buildings where the floors have already been laid.

The narrow widths give a most pleasing effect in small or medium sized rooms, and its durability is practically equal to that of the house itself. The ease with which it can be laid and its ability to overcome uneven subfloors have been factors in favor of oak-strip flooring.

Department stores, dance halls, hospitals, assembly halls, and residences are the principal outlets for American oak flooring in Great Britain, and while it is comparatively new in this market its use is expanding from year to year.

Austrian oak.—Austrian or Slavonian oak strips are imported into Great Britain in fair quantities for manufacturing into tongue and groove and square-edge flooring in local planing mills. The Austrian oak, strictly speaking, grows only in the Province of Slavonia, now part of the Kingdom of Yugoslavia, but prior to the treaty of Versailles belonging to the Austrian Empire, hence the old name is still used.

The strips are imported in "prime" quality only and in lengths 6 feet and longer, 1, 1¼, and 1½ inches thick by 3½, 4, and 4½ inches wide, both quartered and plain sawn, each size being sold separately. The stock is throughly air-dried before being shipped and is sometimes manufactured into flooring as received, while at others it is kiln-dried, depending upon the condition of the lumber.

A recent innovation has been the offering by a firm in the Netherlands of Austrian oak flooring made in that country out of imported lumber at highly competitive prices in the following specifications: 1 by 4 inches, finished to ⅞ by 3½ inches, 3½ to 7 feet, 5 to 7 feet, and 4 feet long and up, average 8 feet, and it is said that any sizes or longer lengths will be furnished if desired.

Owing to the fact that price has become a great factor in the choice of a hardwood flooring, considerably less Austrian oak is now being used in Great Britain for this purpose than formerly, and there is evidence of an oversupply of strips in spite of the decline in price that has taken place during the past few years.

Japanese oak.—Japanese oak strips are also imported both quartered and plain sawn and made into flooring and, like the Austrian, are one quality, i. e., "prime." The usual specifications are 1 and 1¼ by 3, 3½, 4, 4½, and 5 inches, and are sold either in random widths, or each size separately at a slightly increased price, in lengths of 6 feet and longer.

While Japanese oak may be said to approximate more nearly the American variety than the Austrian, the cost of manufacturing the strips into flooring is making it increasingly difficult for it to compete with the oak flooring imported ready-made from the United States.

Hard maple.—Hard maple flooring has been imported into the United Kingdom from both the United States and Canada for many years and its excellent wearing qualities are well known and appreciated. Practically no maple flooring is used in residences in Great Britain, the main outlet being in factories, especially those where cleanliness is essential, such as flour mills, bakeries, tobacco factories, and textile mills manufacturing cotton or woolen fabrics. It is estimated that fully 50 per cent of the total import of maple flooring is absorbed in the two last-mentioned industries, where the fact that in wearing maple flooring develops a dust which has practically no deleterious effect on the fibers of the textile product, whereas concrete or compositions wear into a mineral dust which tears and cuts the tender strands of wool and cotton threads. The balance of the import is taken by department stores, schools, public buildings, and also dance halls, where its hard-wearing close grain, glassy finish, ability to take applied polish, and light color combine to give a beautiful effect to the room.

The grade which is used almost without exception is known as "prime" and is a special grade put up for the British market. It is said to be a combined grade of 80 per cent clear and 20 per cent No. 1 common and is either a mixture of bundles of each separate grade in those proportions or, as is more commonly the case, it is a composite grade in these ratios.

There is practically no call for the lower grades and one of the leading agents in Great Britain who has been handling maple flooring for over 25 years states he has only sold four cars of "factory" grade during that period and these caused trouble with the buyers. This adherence to "prime" quality is also influenced by the fact that the high transportation charges from the shipping points in Michigan and Wisconsin to England are the same regardless of the quality so that the difference in the f. o. b. value has shrunk to a small percentage by the time the lumber has been landed.

The accustomed usage of wide-faced softwood floors in Great Britain caused a like demand for wide-faced maple flooring and, in pre-war days, it was almost impossible to sell a narrower-faced stock than 4 inches, but with the increased difficulty of procuring such widths, the demand has been transferred to the 3¼-inch face, which is now practically the standard face used here, although there is still some call for other sizes.

The principal sizes used are as follows: 1 by 4 inches, prime tongue and groove, end matched and hollow backed, finished $\frac{25}{32}$ by 3¼ inches, and to a lesser extent, prime tongue and groove, end matched and hollow backed, 1 by 4¾ inches finished $\frac{25}{32}$ by 4 inches, 1¼ by 4 inches finished $1\frac{1}{16}$ by 3¼ inches, 1¼ by 4¼ inches finished $1\frac{1}{16}$ by 4 inches; square edged and jointed, end matched and hollow backed, 1 by 4 inches finished $\frac{25}{32}$ by 3¼ inches, 1¼ by 4 inches finished $1\frac{1}{16}$ by 3¼ inches. Occasionally "square edged" stock is called for with square instead of "matched ends." The usual lengths of prime grade run from 2 to 16 feet, and average 5 to 5½ feet.

It is said that American maple flooring manufacturers have made little, if any, effort to develop the sale of their flooring for, say, ⅜ inch suitable for laying on top of existing softwood floors in British homes and it has been suggested that an organized effort to secure a trial of this type of flooring might possibly bring good results.

Birch and beech.—Small quantities of birch and beech flooring are also imported from the United States and Canada in the same sizes and grades as maple, which are used principally for factory purposes. It is said, however, that the price is not sufficiently lower than maple to induce their use in preference to that species and only nominal quantities are used.

Complaints.—Some difficulty has been experienced with American hardwood flooring on account of the effect of the damp British climate on kiln-dried lumber. As a consequence, it has not always been found satisfactory, trouble developing after the floor has been laid. This matter is of considerable importance and will have to be overcome by American manufacturers if full advantage is to be taken of the opportunities for the sale of hardwood flooring.

Future outlook.—Returning industrial prosperity should lead to the greater use of hardwood flooring in the United Kingdom, of which America should obtain the greater share provided the difficulties already mentioned are overcome and the advantages of such flooring are brought to the attention of potential customers and fostered by close cooperation between manufacturers and their British representatives. Educating the public to the advantage of its use by means of advertising in architects' and builders' journals, magazines of the "home beautiful" type—read to a large extent by women, whose influence is naturally considerable in the selection of floors for the home—and distribution of brochures containing illustrations of rooms with the floors in natural colors would all help to increase the use of hardwood flooring, and money spent for such purposes would be a profitable investment. It would be preferable, however, that advertising matter of this character bear the name of an association or some nontrading body so as to bear the stamp of impartiality rather than that of a firm interested in the sale of flooring, who might be accused of only giving favorable facts in order to promote sales.

MATCHED LUMBER

In addition to flooring, large quantities of dressed softwood lumber, used for partitions, skirtings, shelving, and interior finish, are imported into the United Kingdom from northern Europe, over 90 per cent coming from Sweden and Norway, and, like flooring, are of both spruce and pine.

However, as it requires wider material to make this stock than flooring and the trees in Norway being smaller than in Sweden, a greater proportion of the trade goes to the latter country. Small quantities also come from Finland, but there are few planing mills, comparatively speaking, in that country. The following table shows the imports of matched lumber into the United Kingdom during the year 1925:

Country	Quantity	Value
	Loads [1]	
Sweden	55,989	£339,861
Norway	19,030	118,905
Finland	4,095	24,982
All other	529	3,560
Total	79,643	487,308

[1] Load equals 600 feet board measure.

Matched stock includes boards tongued, grooved, and beaded one and two sides; tongued, grooved, and V jointed one and two sides; rabbeted and V jointed, etc.

Again, as in flooring, this stock is sold by Norway on a base price list as follows: Tongued, grooved, and beaded one side; tongued, grooved, and V jointed one side; rabbeted and V jointed one side at 5s. per standard (1,980 feet board measure) over square-edged stock; while tongued, grooved, and beaded two sides, tongued, grooved, and V jointed two sides, and rabbeted and V jointed two sides, all take 40s. per standard additional. No difference is made whether the stock be spruce or pine. The usual additions for thin stock—i. e., 10s. per standard for ¾ inch, 20s. for ⅝ inch, and 40s. for ½ inch—are made. In this connection, it must be understood that the measurements are based on the nominal size board measure and thin stock (stock under 1 inch nominal) is not considered as 1 inch as in American trade practice for invoicing purposes, but rather as of the nominal thickness.

OTHER DRESSED LUMBER

In addition to matched lumber, there is imported about an equal quantity of other dressed softwood lumber, principally box boards, but included is a small percentage of interior finish, such as nosed boards, skirting or base boards, torus, and shelving, chiefly from northern Europe. A small quantity of spruce shelving boards is also imported from Czechoslovakia. Imports of other dressed lumber into the United Kingdom during the year 1925 are shown in the following table:

Country	Quantity	Value
	Loads	
Sweden	37,479	£238,518
Norway	22,097	134,753
Czechoslovakia	1,631	10,874
United States	2,708	35,570
Other	5,043	30,829
Total	68,958	450,544

Shelving boards are dressed on both sides and edges, but while the face must be perfectly smooth, the other or underside is only rough dressed or "scotched" as it is called in the trade, and are used for the purpose their name indicates. They are of spruce and pine (or whitewood and redwood, as they are called in the trade) and are usually 1 by 9 or 11 inches wide, in the same lengths as flooring—6 feet and longer.

They are usually sold by Norway on the basic price list of £1 per standard (1,980 feet board measure) for the 9-inch, and £4 per standard for 11-inch over 1 by 6½ and 7 inches square edged, but the extras may vary.

Imports from America.—Imports of "other dressed lumber" from American include box shooks imported for the manufacture of containers to be returned filled with goods and are used in order to avoid the import duty. In addition to these box shooks, there is brought in some western white and sugar pine dressed four sides, used principally in Scotland for high-class interior finish, and an occasional car of North Carolina pine for the less expensive coffins.

FLOORING BLOCKS

The use of wood flooring blocks has increased to a considerable extent in Great Britain during the past few years and has now attained large proportions. While more expensive in the first instance, owing principally to the greater cost of laying, such floors possess several marked advantages over those made from ordinary strip flooring, the most important of which is their superior wearing qualities. The fact that they can be laid direct onto concrete or other mineral foundation, the ability to lay them in various patterns and not only in straight lines, and the ease with which worn spots can be replaced, are also important advantages.

The usual length of blocks is 9 or 12 inches (nominal), and, being laid in patterns, the wear is largely diagonal, or at right angles to the grain, so that the tendency to sliver is reduced to a minimum. Further, it is much less difficult to get edge grain in blocks than in lumber so that, while most of the strip flooring used is flat grain, a much greater proportion of the blocks used is edge grain, and even when of north European softwood a large percentage of edge grain is included. The combination of these factors naturally adds to the wearing qualities of block floors, and offsets, to a considerable extent, the original higher cost as compared with ordinary strip flooring.

The fact that most public buildings and factories now have floors of fire-resisting material, such as concrete, also favors the use of blocks because they can be laid on such floors direct, whereas strip flooring can not be used unless wooden fillets are let in first.

The matter of repairing worn floors is one of importance because on most of them, especially in factories or public buildings, the traffic is not evenly distributed; as a consequence, some parts wear out more quickly than others. This is particularly true in factories, where the floors under machinery are never touched from the time they are laid, while in the passageways they are constantly being worn by the shoes of the operatives and wheels of trucks carrying material from one department to another. Again, in assembly halls, churches, and public buildings, certain sections of the floor are rarely walked on, the wear being confined to aisles, centers of corridors, and portion near entrance doors, and these sections have to be renewed from time to time. Should the floors be made of strip lumber, it would be necessary to take up full lengths of boards, and if these are tongued and grooved there would be danger of breaking the tongue on adjoining good boards. As a consequence of these conditions, a comparatively large section of the floor must be taken up to replace the small part that has been worn. Should, however, the original floor have been laid with blocks, the problem of replacing a worn section is a simple one, new blocks being substituted for the worn ones with comparatively little trouble or expense.

Sources.—While some finished blocks are imported, the greater number of those used are made out of imported lumber, usually 3 by 9 inches, by firms who have made a specialty of the business, and with the growth in their use the trade in them has become an important branch of the lumber industry. American machinery is considered by some as the best for this purpose on account of the speed with which the blocks can be turned out and the accuracy of manufacture. A notable exception, however, to the general rule are Douglas fir blocks, practically all of which are imported ready-made from the Pacific coast of the United States. Some maple blocks are also imported, but the demand for this species is comparatively small compared with others.

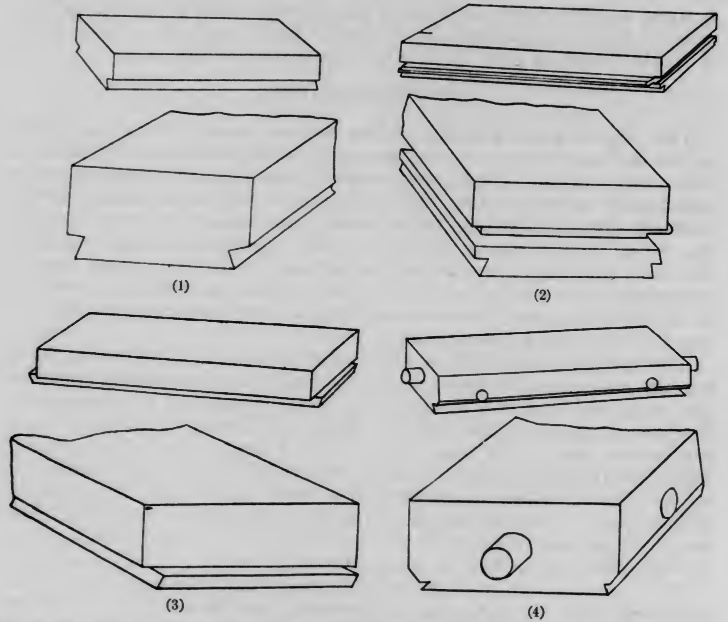


FIG. 21—Types of wood-block flooring: (1) Dovetail or ordinary V groove; (2) tongue and groove and end grooved; (3) grooved and end tongued; (4) doweled

Import and distributing methods.—Imported blocks are usually packed in crates or cases of approximately 100 each and are handled in the trade by the same methods as any other lumber, that is, through regular agents acting as exclusive sales agents for the foreign exporter.

These agents sell only to recognized importers, most of whom are also manufacturers. The trade in wood blocks, however, has become a specialized business and is in comparatively few hands. These importer-dealers naturally supply wood blocks of all species, and most of them employ a staff of expert layers and quote laid-down prices to builders and contractors, thereby eliminating middlemen's profits and enabling close prices to be made.

Types, sizes, and quality.—Four types of wood blocks are used, namely, V grooved or dovetailed, tongued and grooved, grooved and end tongued, and doweled. Of these, the first two are most commonly used, while doweled blocks are seldom called for.

Sizes of blocks have been standardized, to a great extent, the principal sizes of those made in the United Kingdom being as follows: 1 by 3 by 9 inches finished to ⅞ by 2⅞ by 8⅝ inches, *1¼ by 3 by 9 inches finished to 1⅛ by 2⅞ by 8⅝ inches, *1½ by 3 by 9 inches finished to 1⅜ by 2⅞ by 8⅝ inches, 1 by 3 by 12 inches finished to ⅞ by 2⅞ by 11½ inches, *1¾ by 3 by 12 inches finished to 1⅜ by 2⅞ by 11½ inches. The actual finished sizes of those imported from America are as follows: ⅞ by 3 by 9 inches, *1⅛ by 3 by 9 inches, *1⅜ by 3 by 9 inches, ⅞ by 3 by 12 inches, 1⅛ by 3 by 12 inches, 1⅜ by 3 by 12 inches. The sizes marked with an asterisk (*) are those principally used.

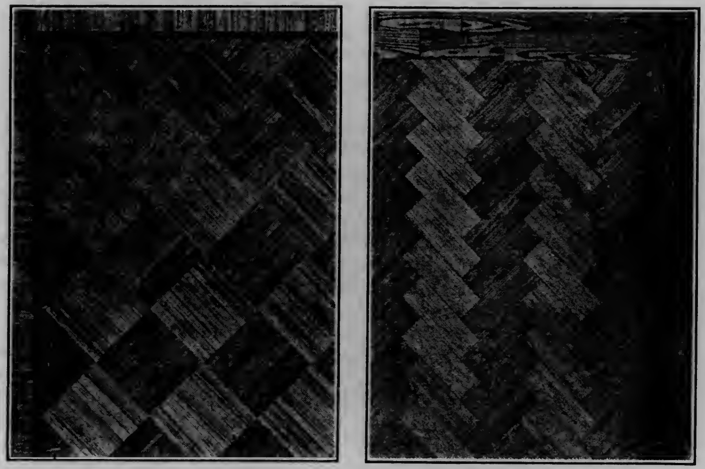


FIG. 22.—Wood-block floors; basket pattern and herringbone pattern

It will be noted that the length is in exact multiples of the width, which permits a perfect pattern to be laid. Locally made blocks are graded in two qualities—"first," which must be free from knots, sap, and other defects, and "second," in which a few sound knots are admitted. Imported blocks, however, are used in one grade only. All lumber is kiln-dried or thoroughly air-seasoned before being manufactured into blocks.

The most popular pattern laid is "herringbone," and it is estimated that approximately 95 per cent of the wood-block floors laid in Great Britain are of this pattern. Next in popularity is the "basket" pattern, followed by various others.

grooved there would be danger of breaking the tongue on adjoining good boards. As a consequence of these conditions, a comparatively large section of the floor must be taken up to replace the small part that has been worn. Should, however, the original floor have been laid with blocks, the problem of replacing a worn section is a simple one, new blocks being substituted for the worn ones with comparatively little trouble or expense.

Sources.—While some finished blocks are imported, the greater number of those used are made out of imported lumber, usually 3 by 9 inches, by firms who have made a specialty of the business, and with the growth in their use the trade in them has become an important branch of the lumber industry. American machinery is considered by some as the best for this purpose on account of the speed with which the blocks can be turned out and the accuracy of manufacture. A notable exception, however, to the general rule are Douglas fir blocks, practically all of which are imported ready-made from the Pacific coast of the United States. Some maple blocks are also imported, but the demand for this species is comparatively small compared with others.

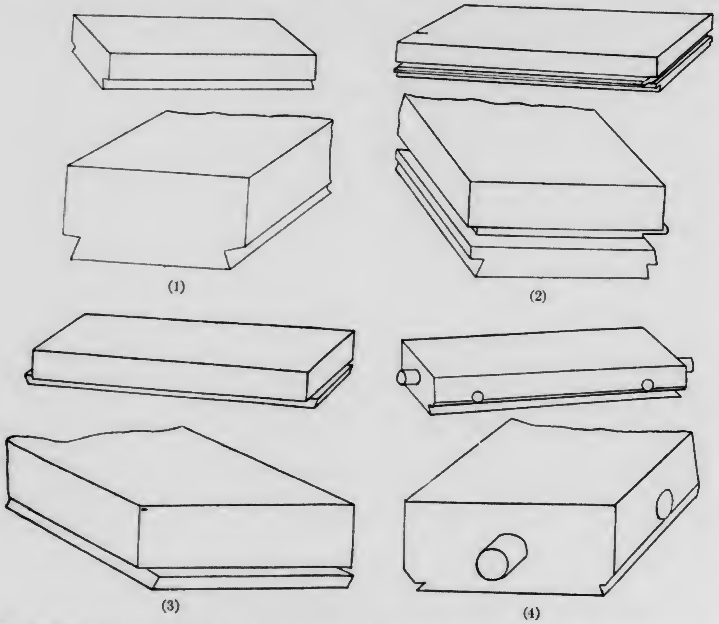


Fig. 21—Types of wood-block flooring: (1) Dovetail or ordinary V groove; (2) tongue and groove and end grooved; (3) grooved and end tongued; (4) doweled

Import and distributing methods.—Imported blocks are usually packed in crates or cases of approximately 100 each and are handled in the trade by the same methods as any other lumber, that is, through regular agents acting as exclusive sales agents for the foreign exporter. These agents sell only to recognized importers, most of whom are also manufacturers. The trade in wood blocks, however, has become a specialized business and is in comparatively few hands. These importer-dealers naturally supply wood blocks of all species, and most of them employ a staff of expert layers and quote laid-down prices to builders and contractors, thereby eliminating middlemen's profits and enabling close prices to be made.

Types, sizes, and quality.—Four types of wood blocks are used, namely, V grooved or dovetailed, tongued and grooved, grooved and end tongued, and doweled. Of these, the first two are most commonly used, while doweled blocks are seldom called for.

Sizes of blocks have been standardized, to a great extent, the principal sizes of those made in the United Kingdom being as follows: 1 by 3 by 9 inches finished to ⅞ by 2⅞ by 8⅝ inches, *1¼ by 3 by 9 inches finished to 1⅛ by 2⅞ by 8⅝ inches, *1½ by 3 by 9 inches finished to 1⅜ by 2⅞ by 8⅝ inches, 1 by 3 by 12 inches finished to ⅞ by 2⅞ by 11½ inches, *1¾ by 3 by 12 inches finished to 1⅜ by 2⅞ by 11½ inches. The actual finished sizes of those imported from America are as follows: ⅞ by 3 by 9 inches, *1⅛ by 3 by 9 inches, *1⅜ by 3 by 9 inches, ⅞ by 3 by 12 inches, 1⅛ by 3 by 12 inches, 1⅜ by 3 by 12 inches. The sizes marked with an asterisk (*) are those principally used.

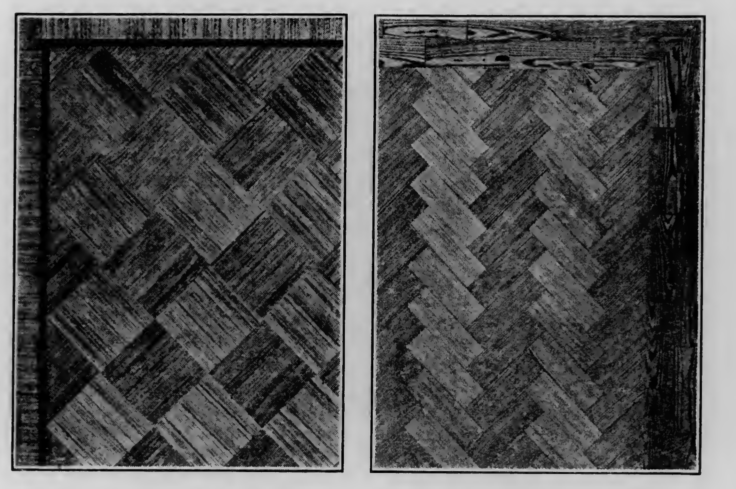


Fig. 22.—Wood-block floors; basket pattern and herringbone pattern

It will be noted that the length is in exact multiples of the width, which permits a perfect pattern to be laid. Locally made blocks are graded in two qualities—"first," which must be free from knots, sap, and other defects, and "second," in which a few sound knots are admitted. Imported blocks, however, are used in one grade only. All lumber is kiln-dried or thoroughly air-seasoned before being manufactured into blocks.

The most popular pattern laid is "herringbone," and it is estimated that approximately 95 per cent of the wood-block floors laid in Great Britain are of this pattern. Next in popularity is the "basket" pattern, followed by various others.

Method of laying.—Wood blocks are usually laid on concrete floors, and as they can be laid direct onto it without any preparation (other than a coating of naphtha varnish) they have a decided advantage over strip flooring. In laying the floor the block is dipped up to half its depth in hot mastic (a mixture of bitumen and tar) and laid direct on the floor. Various compositions are put up by sundry manufacturers ready mixed and sold under the name of "mastic." The dovetail or tongue and groove on the lower face of the block keys it securely to the floor and adjacent block. Sometimes blocks with a slight bevel on the edges are asked for, but unless the bevel is limited to the lower half of the total thickness of the block trouble will ensue, as the mastic will be forced upward and will spread on the surface of the floor. Particular attention must be paid to this matter, as failure to do so has resulted in heavy claims having been paid by American shippers of Douglas fir blocks. It is considered of the greatest importance that the concrete foundation should be floated to a perfectly level surface and be absolutely dry and hard before the blocks are laid.

PRINCIPAL SPECIES USED

The principal species used for floor blocks are southern pine (pitch pine), northern European and White Sea pine (redwood), oak, Douglas fir, and hard maple, with small quantities of various other species. The particular species used is largely determined by the character of the building in which the floor is to be laid. For instance, factories and textile mills use hard maple almost exclusively, while teak is preferred by some for hospitals. In cases where the type of building is not the determining factor, the owners' or architects, choice, or else the cost, may decide the matter.

Oak.—Foremost of the hardwoods used for block flooring is oak, it being estimated that about 10 per cent of the annual consumption is of this species, the Austrian (Slavonian) being preferred on account of its uniform color, grain, and freedom from sap. The cost of these blocks, however, is such that their use is confined to buildings where a high-class floor is desired, such as residences, art galleries, ballrooms, hotels, and high-class department stores. Blocks are made in local factories out of imported strips and also imported in a finished state, the usual specifications being as follows: Block strips—1¼ by 2¾, 3, 3¼, and 3½ inches, 10 to 40 inches long in 2-inch multiples. Prepared blocks—⅞ by 3 by 9 inches, ⅞ by 3⅜ by 10⅛ inches, ⅞ by 3 by 12 inches, ⅞ by 4 by 12 inches; these are actual finished sizes, kiln-dried, with 50 per cent quartered.

In addition, however, there have recently been brought in from the Netherlands and Belgium blocks of Austrian oak, made in those countries and sold in Great Britain at prices that compete with those of local manufacture.

English oak is being used to an increasing extent for block flooring, while small quantities of Russian, Japanese, and Polish oak are also used, being manufactured in local factories from strips.

Only recently has any American oak been used for block floors, and this has been imported in a finished form as an introductory experiment. Sufficient time, however, has not elapsed as yet to ascertain the possibilities of the development of this business.

Hard maple.—Hard maple blocks are imported ready made from both the United States and Canada and are also manufactured to some extent in local sawmills out of imported strips. These strips usually are 1, 1¼, and 1½ by 3 and 3½ inches, cut full, in multiples of 9 inches. The imported blocks are generally made from kiln-dried lumber, tongued and grooved, end matched, and hollow backed. The principal outlet for maple blocks is in factories, textile mills, post offices, and telephone exchanges, where the floors are subjected to heavy wear.

Southern pine.—For many years southern pine, or pitch pine, has been used in the United Kingdom for floor blocks. It is the most popular of all the softwoods used for this purpose, and it is estimated that more than 50 per cent of all the wood used for floor blocks is southern pine. The blocks are made in local factories, generally from 3 by 9 inch Rio deals, none being imported ready-made. During the process of manufacture from 70 to 80 per cent edge-grain blocks are ordinarily obtained. These edge-grain blocks are used where the wear will be heaviest, while the flat-grain ones are laid around borders or other places where they will be seldom walked on. It is believed in some quarters that there is an opportunity for the importation of kiln-dried edge-grain blocks, provided they can be delivered exact to size and at a price that can compete with those made locally.

European softwoods.—No finished softwood blocks are imported into Great Britain, but large quantities are made from lumber in local factories, and it is estimated that this species supplies about 30 per cent of the annual requirements of this market. They are used for floors in churches, public schools, department stores, and corridors in office buildings where an inexpensive floor is required.

Pine from northern Europe and the White Sea is preferred, the lumber used to manufacture the blocks frequently being imported in short lengths known as "ends" 1½ to 11 feet long rising in multiples of 6 inches, 3 inches thick by 5 to 11 inches wide, in "unsorted" quality. From 50 to 60 per cent of edge-grain blocks can be furnished without great difficulty out of the ordinary lumber used in their manufacture.

Douglas fir.—Floor blocks of this species, also called Oregon or Columbian pine, have gained considerably in popularity since the armistice, largely on account of their fine appearance and the reasonable price at which they can be obtained. While some blocks are made locally from imported strips, the majority used are imported ready-made from America. The usual specification called for is kiln-dried, rift-sawn, clear of all defects on face, with a groove or dovetail on the lower face, the principal sizes being those finished to 1⅛ and 1⅜ by 3 by 9 inches.

Douglas fir blocks are used largely in schools, assembly halls, and office buildings—in fact, anywhere where a higher-class wood than European pine is desired, but still one of moderate cost.

There has, unfortunately, been considerable trouble over many shipments on account of imperfectly manufactured blocks being delivered, the most frequent complaints being that widths are scant, that the ends are not square, or that the blocks are concave and will not lie flat. Heavy claims have been paid by American shippers, and in some instances parcels have been refused in their entirety, so that a bad impression has been given that will be difficult to eradicate.

Douglas fir, however, is recognized as a superior wood that can be obtained at a most reasonable price, and it is considered by many handling the blocks that if the question of irregularity of size can be overcome their use should materially increase.

Other species.—Small quantities of other hardwood species besides those already mentioned are also used, the principal being teak for hospital floors, apitong (bagac) from the Philippine Islands, gurjun from India, Australian jarrah, continental beech, and Finnish birch, the last two mentioned being imported in finished blocks as well as being made from strips locally.

The use of apitong is growing, and some large department stores and recreation buildings have been floored with it within recent years. The blocks are manufactured locally from imported strips, usually 1 by 3 inches, 1 by 3½ inches, 1 by 4 inches, and 1¼ by 3 inches, 10 feet long and up, averaging about 13 feet. All of these are used for buildings where a hardwood floor is desired, the choice being according to the preference of the owner or the price to be paid. They are laid either alone or mixed, and most agreeable effects are obtained by laying patterns in woods of contrasting colors, such as oak and jarrah, southern pine and jarrah.

Among other softwoods used is California white pine, the blocks of which are imported ready-made. This, however, is a comparatively new business and sufficient time has not elapsed since its introduction to ascertain its possibilities.

CRITICISM OF AMERICAN BLOCKS

The most common complaint made against American imported floor blocks, especially those of Douglas fir, which are usually manufactured from kiln-dried lumber, is that, in many cases, they show a variation of $\frac{1}{32}$ to $\frac{1}{16}$ of an inch in width and that the ends are not exactly square on arrival, so that they can not be laid to a perfect pattern. This is the principal complaint, and unless it can be remedied the prospects of developing this business are slight. If, however, Douglas fir blocks can be delivered in England in the exact sizes called for by the specification, the outlook for materially increasing the business in them would appear bright, as apparently they can be sold c. i. f. at prices that can successfully compete with the domestic block made out of imported strips. The wood itself is in popular favor, and the fact that the blocks are clear of all defects, are edge grain, and are of comparatively low cost, gives Douglas fir an advantage over other soft woods where something better than a European pine block is desired.

This defect of irregularity in size, it is said, is common not only to Douglas fir (although that being imported from America in larger quantities than any other species is most frequently mentioned) but to maple also, and there would be danger of it developing in any block made out of kiln-dried lumber shipped long distances by water. It is therefore essential that American firms catering to the market bear in mind the atmospheric conditions prevalent in Great Britain and take precautions to meet them if they are not to lose the business they have already developed.

FUTURE OUTLOOK

A formidable handicap to the greater use of block flooring in the past has been its cost, a large portion of which consisted of labor charges for laying. It was not feasible to lay the blocks in straight lines like strip lumber, but in patterns, and naturally the job was a slow one for workmen handling them only occasionally. This was all changed, however, by the large dealer-manufacturers making laid-down prices to builders and contractors. The workmen being steadily employed on block floors developed great dexterity, and consequently the cost of laying was materially reduced. However, most of this labor is paid at piecework rates, and no time is spent on blocks of defective manufacture, which are immediately discarded as worthless and become a total loss. As the job is generally some distance from the factory, it can readily be understood that great care is taken to see that only perfect blocks are delivered. As a consequence of this changed condition of "laid-down" quotations, the use of blocks has developed rapidly, and it is considered that it will continue to do so, as the advantages of wood-block floors for many purposes are being increasingly recognized.

What share of the business will be done in imported American blocks, however, will depend to a large extent on manufacturers solving the problem of how to deliver them to exact size. If this can be done, it is believed that American blocks can successfully compete with blocks made locally, and that trade in the American product will materially increase.

PARQUETRY

Parquetry is a species of joinery or cabinetwork consisting of an inlay of geometric or other patterns of different colors used especially for floorings. From this definition, floors laid of wood blocks could properly be considered parquetry, but in Great Britain a distinction is made between them. Generally speaking, parquetry floors are those made either of short strips of thin-dressed lumber of uniform size called "battens" or else of panels. Battens are made both quartered and plain sawn; they are never mixed, however, but are laid all of one or the other. They must be clear of all defects and must be all heart, as sap would prevent a floor of uniform color, which is essential.

The size generally used is ¼ by 3 inches in various lengths from 9 to 24 inches, but those 9 or 12 inches long are most commonly used. Panels are generally ¼ inch thick by 12 inches square and are made of many pieces of lumber arranged to form various patterns and glued together so as to form one piece or panel. Panels for dance floors, however, are an exception and are generally made 1 inch thick. Panel floors are always finished with borders, which are made by the panel manufacturers. These borders vary from 2½ to 17½ inches in width, the wide patterns running from 12 to 18 inches in length, while the narrow are in lengths of 5 to 8 feet. The lumber is always thoroughly kiln-dried before being made into battens or panels or borders, and oak is the species invariably used. The Austrian variety is preferred to all others on account of its uniform color and even texture and is always employed for high-class work. Practically all borders and also many panels are made in patterns having an inlay of a different colored wood, and, for this purpose, American black walnut is preferred on account of the attractive contrast its color makes against the oak.

The floors of shop windows, particularly of department, ladies' ready-to-wear, millinery, tobacconists', and shoe stores, private offices, high-class residences, and ballrooms are the principal outlets for parquetry in Great Britain; in fact, it is used wherever a superior and artistic floor not subjected to heavy wear is desired and price is a secondary consideration.

During April, 1927, a leading London firm was quoting 5s. 6d. per square yard for battens for five designs to be laid by local carpenters, while for floors laid complete, polished and waxed, anywhere in the United Kingdom the price was 13s. per square yard. The cost of panel floors varies according to the pattern used. At the same time, Austrian oak battens ¼ by 3 by 9 inches were being offered at 4d. to 4½d. per square foot c. i. f. United Kingdom, or from 1s. to 1s. ½d. per square yard, and panels from 5d. to 11d. per square foot, c. i. f., according to pattern.

Sources of supply.—Owing to the difficulty of meeting foreign competition in ready-made panels, the British parquetry industry is confined largely to the manufacture of battens out of imported strips and heavy panels 1 inch thick used for dance halls. These oak strips are imported in "prime" quality, free of sap and clear of all defects, both quartered and plain sawn, and come principally from Yugoslavia, although the description "Austrian oak" is still used in Great Britain. The usual specifications are 1 by 3 inches, 10 to 40 inches long, rising in multiples of 2 inches. Next in importance, although much less in volume, are the Japanese "prime" oak strips imported 1 by 3 inches, 18 inches to 5 feet long, both quartered and plain sawn.

However, the majority of the parquetry used is imported from Belgium in the form of panels made of kiln-dried oak, and it is estimated that from 60 to 70 per cent of Great Britain's annual requirements come from that source. Belgium has long specialized in its manufacture and even before the war had the bulk of the British business. During the war this business naturally stopped, but since the armistice, helped among other things by low exchange, has rapidly regained its old-time preeminence. In addition to panels and borders, Belgium also ships battens to the United Kingdom which strongly compete with the locally made product. All of these are made from Austrian or Volhynian oak, and where a contrasting color is required for pattern purposes American black walnut is used.

Next to Belgium as a source of supply is the Netherlands, although comparatively a newcomer to this market; the quantity, however, is small by comparison. Small quantities are also received from France and Yugoslavia. All these countries use the Austrian or Volhynian oak for panels, borders, and battens. In addition, small quantities of oak battens are received from Czechoslovakia, via Hamburg and Poland, but so far they have not proved very satisfactory.

Packing.—Panels ½ by 12 by 12 inches, the size most generally imported, are packed in crates of approximately 60 to the crate; borders are in bundles of 30 to 50 pieces, depending on the size, fastened together with wood strapping; and battens are also in bundles of about 250 pieces, fastened in the same manner. The weight of these crates and bundles must not exceed 56 pounds as heavier ones are difficult to handle.

Usually imported material is wrapped in waterproof paper before crating because kiln-dried lumber, dried to a uniform moisture content (generally a low one) is used exclusively in the manufacture of battens, panels, and borders. The danger of their warping through exposure to a moist atmosphere is therefore considerable, and great care is taken by continental manufacturers to protect the stock from dampness during transit.

In order to avoid the danger of having damaged stock on their hands, British importers, as a rule, only carry small stocks, orders being placed as received and rushed as quickly as possible to the job after arrival.

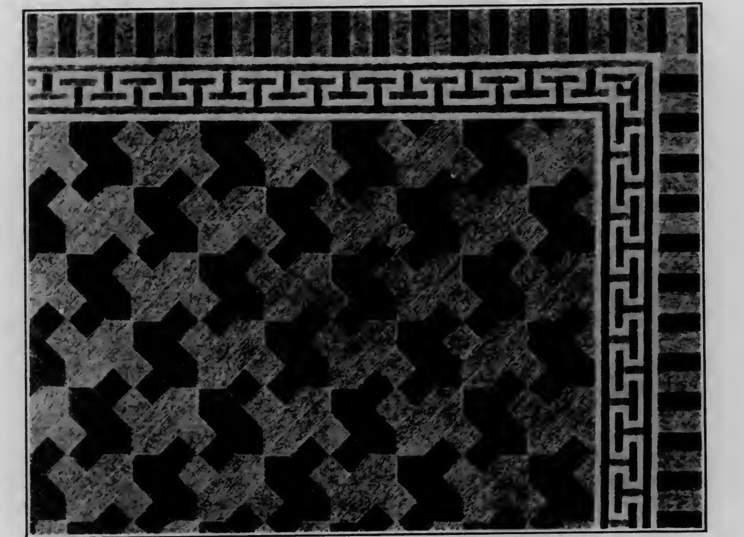


Fig. 23.—An example of elaborate parquetry flooring

Local manufacturers also take great care to protect their battens from the atmosphere and like to deliver them to the job as soon as possible after leaving the dry kiln.

Patterns used.—Parquetry floors made of battens are usually laid in "herringbone" pattern, although "basket" or other patterns are sometimes called for, but by far the great majority are in the first named. There are between 40 and 50 different patterns of panels, some of them very elaborate, containing many small pieces, while others have an inlay of American black walnut. Borders also are made to show many beautiful effects obtained by combining the "Austrian" oak with American black walnut.

Methods of laying.—Parquetry is laid over a subfloor of wood, which must first be made absolutely level and any paint or stain planed off, as glue will not adhere to it. The border is then laid around the baseboard, pinned and glued down.

walnut is preferred on account of the attractive contrast its color makes against the oak.

The floors of shop windows, particularly of department, ladies' ready-to-wear, millinery, tobacconists', and shoe stores, private offices, high-class residences, and ballrooms are the principal outlets for parquetry in Great Britain; in fact, it is used wherever a superior and artistic floor not subjected to heavy wear is desired and price is a secondary consideration.

During April, 1927, a leading London firm was quoting 5s. 6d. per square yard for battens for five designs to be laid by local carpenters, while for floors laid complete, polished and waxed, anywhere in the United Kingdom the price was 13s. per square yard. The cost of panel floors varies according to the pattern used. At the same time, Austrian oak battens ¼ by 3 by 9 inches were being offered at 4d. to 4½d. per square foot c. i. f. United Kingdom, or from 1s. to 1s. ½d. per square yard, and panels from 5d. to 11d. per square foot, c. i. f., according to pattern.

Sources of supply.—Owing to the difficulty of meeting foreign competition in ready-made panels, the British parquetry industry is confined largely to the manufacture of battens out of imported strips and heavy panels 1 inch thick used for dance halls. These oak strips are imported in "prime" quality, free of sap and clear of all defects, both quartered and plain sawn, and come principally from Yugoslavia, although the description "Austrian oak" is still used in Great Britain. The usual specifications are 1 by 3 inches, 10 to 40 inches long, rising in multiples of 2 inches. Next in importance, although much less in volume, are the Japanese "prime" oak strips imported 1 by 3 inches, 18 inches to 5 feet long, both quartered and plain sawn.

However, the majority of the parquetry used is imported from Belgium in the form of panels made of kiln-dried oak, and it is estimated that from 60 to 70 per cent of Great Britain's annual requirements come from that source. Belgium has long specialized in its manufacture and even before the war had the bulk of the British business. During the war this business naturally stopped, but since the armistice, helped among other things by low exchange, has rapidly regained its old-time preeminence. In addition to panels and borders, Belgium also ships battens to the United Kingdom which strongly compete with the locally made product. All of these are made from Austrian or Volhynian oak, and where a contrasting color is required for pattern purposes American black walnut is used.

Next to Belgium as a source of supply is the Netherlands, although comparatively a newcomer to this market; the quantity, however, is small by comparison. Small quantities are also received from France and Yugoslavia. All these countries use the Austrian or Volhynian oak for panels, borders, and battens. In addition, small quantities of oak battens are received from Czechoslovakia, via Hamburg and Poland, but so far they have not proved very satisfactory.

Packing.—Panels ½ by 12 by 12 inches, the size most generally imported, are packed in crates of approximately 60 to the crate; borders are in bundles of 30 to 50 pieces, depending on the size, fastened together with wood strapping; and battens are also in bundles of about 250 pieces, fastened in the same manner. The weight of these crates and bundles must not exceed 56 pounds as heavier ones are difficult to handle.

Usually imported material is wrapped in waterproof paper before crating because kiln-dried lumber, dried to a uniform moisture content (generally a low one) is used exclusively in the manufacture of battens, panels, and borders. The danger of their warping through exposure to a moist atmosphere is therefore considerable, and great care is taken by continental manufacturers to protect the stock from dampness during transit.

In order to avoid the danger of having damaged stock on their hands, British importers, as a rule, only carry small stocks, orders being placed as received and rushed as quickly as possible to the job after arrival.

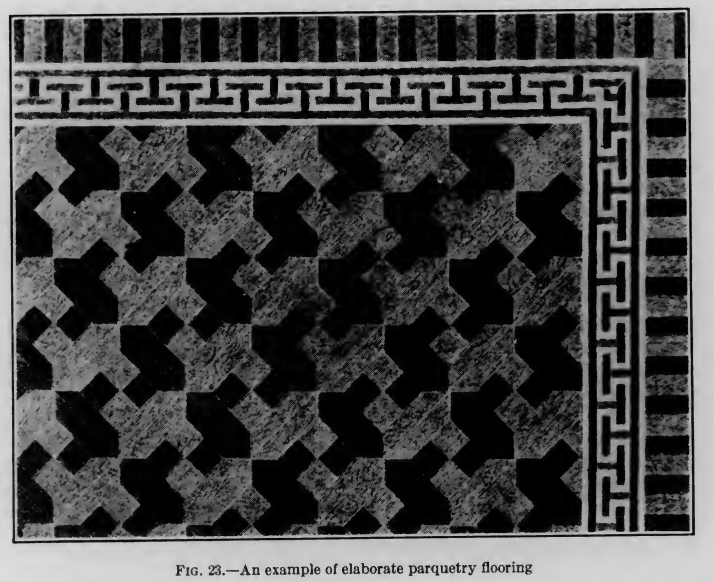


FIG. 23.—An example of elaborate parquetry flooring

Local manufacturers also take great care to protect their battens from the atmosphere and like to deliver them to the job as soon as possible after leaving the dry kiln.

Patterns used.—Parquetry floors made of battens are usually laid in "herringbone" pattern, although "basket" or other patterns are sometimes called for, but by far the great majority are in the first named. There are between 40 and 50 different patterns of panels, some of them very elaborate, containing many small pieces, while others have an inlay of American black walnut. Borders also are made to show many beautiful effects obtained by combining the "Austrian" oak with American black walnut.

Methods of laying.—Parquetry is laid over a subfloor of wood, which must first be made absolutely level and any paint or stain planed off, as glue will not adhere to it. The border is then laid around the baseboard, pinned and glued down.

To lay the floor proper, a string guide line is run through the center of the room parallel with the longest wall. The panels or battens are laid starting from this guide line and worked toward the walls, and are cut to fit at the border. The floor is thus laid but not fastened down.

A small area at a time is then taken up; the glue is applied to the undersides and the panels are pinned to the subfloor with 1-inch panel pins. It is preferable that each panel be pinned in six places. After the pins are punched in, the floor surface is planed and scraped so as to get an absolutely smooth finish, after which the pinholes are stopped with colored putty and one coat of French polish applied. The floor is then sandpapered and finished with wax and two more coats of French polish are added to finish.

When the floor is to be laid in a new building, it is essential that the room be thoroughly dry, otherwise there is danger of trouble developing through the lumber absorbing moisture afterwards and buckling.

Trade procedure.—With a few exceptions, and those being very large firms engaged in business as store, bank, and office fitters, manufacturers both in Great Britain and on the Continent sell only to recognized importers, who in turn sell to consuming trades, such as builders, store fitters, etc. In many instances these importers also do the laying, it being more convenient for the builder or shopfitter to subcontract the parquet floors than to buy the material and have it laid by workmen having little experience with it. Many of the continental exporters maintain representatives in London to handle their British trade, while others do their business direct by mail.

No minimum is placed on the size of an order by the foreign exporter, and practically any quantity of any pattern will be accepted and delivery made within a week or 10 days at the outside. As there are practically daily sailings from Antwerp and Rotterdam to London, the principal distributing center for parquetry, little delay in transit takes place, and time is also saved by the steamship companies undertaking to deliver direct to a job so that stock can be shipped on a through bill of lading to final destination.

American participation.—In the opinion of well-informed persons, it is doubtful whether Austrian oak will ever be supplanted for high-class parquetry work in Great Britain.

While variation in color and texture and presence of sap in American oak lumber are all undesirable features in the eyes of the British parquetry trade and handicap its use for that purpose, it is possible that, provided the strips were specially selected and the stock carefully protected from atmospheric changes during transit so as to arrive absolutely flat and exact size, a market could be developed for battens in Great Britain. Not that they would supplant the stock now being used, but rather would extend the use of parquetry to the vast numbers of store windows where cost now makes its use prohibitive. It may be that as the moderate cost of American oak strip flooring is stimulating a demand for hardwood floors, so would inexpensive parquetry open up avenues for its use heretofore untouched.

NOTE.—The import trade in wood manufactures is discussed in detail on pp. 298–323. That section is placed after the section on wood-consuming industries in order to show first the manufactured wood products made in England, and then those which are most economically imported.

MISCELLANEOUS ITEMS

TIES

Any mention of ties in the lumber press or trade would be sought for in vain in Great Britain, for the reason that what are known as crossties in the United States are called "sleepers," while switch ties are "crossings." Only softwood ties are used, and apart from a very small quantity required by the collieries and subways of London, practically the entire importation of ties is consumed by the railroads. According to the annual report of the Ministry of Transport, 4,322,402 crossties were used in maintaining the permanent way on British railroads in 1925. Very few of these were for new extensions, the great majority being to replace worn-out ties.

The following table shows the imports of crossties in loads of 600 feet board measure, since the armistice, no figures being available before that time. Switch ties or crossings being considered timber are not included:

Year	Quantity	Value	Year	Quantity	Value
	Loads			*Loads*	
1919	191, 283	£1, 659, 930	1923	294, 215	£1, 339, 941
1920	217, 993	2, 345, 007	1924	452, 692	2, 276, 436
1921	322. 518	3, 252, 348	1925	451, 324	2, 207, 428
1922	211, 699	1, 114, 088	1926	223, 282	887, 080

The market for ties being, for all practical purposes, limited to the four big railroad groups, imports are governed by their requirements. These, in turn, are largely influenced by financial considerations rather than actual needs. The exceptionally heavy importations, therefore, during 1922 and 1924 were doubtless effected by extensive plans for rail re-laying, which is always done on new ties, in addition to the normal replacement of worn-out ties. The coal stoppage of 1926, however, which lasted from May until the end of the year, completely upset the railroads' plans for that year, consumption being so reduced that not only were new purchases reduced to a minimum but a large part of the ties carried over from the previous year remainded on hand at the end of 1926.

The British railroads are now suffering from the heavy loss in income caused through motor competition, and the strictest economy will doubtless be exercised and expenditure kept a minimum for some time to come. This economy was reflected in the tie imports for 1927, which, for the first seven months, amounted to only 60 per cent of the corresponding period in 1926 and 37 per cent of 1925.

No untreated ties are used on permanent ways in this country, the general custom being to have them impregnated with 40 to 50 gallons of creosote to the load (50 cubic feet), equal to about 3 gallons to the standard crosstie.

Principal consumers.—During 1925 the principal consumers of crossties in Great Britain, according to the annual report already referred to, were as shown in the following statement:

	Number
London & North Eastern Railroad	1, 296, 338
London, Midland & Scottish Railroad	1, 290, 736
Great Western Railroad	881, 172
Southern Railroad	711, 240
All other	142, 916
Total	4, 322, 402

Between 40 and 50 lines are included in the "all other" group, many of them being only a few miles in length, such as those on private docks, short tap lines, and subways in London, none of which are of importance in considering the tie requirements of the United Kingdom.

SOURCES OF SUPPLY

Many countries contribute to furnish the United Kingdom with its tie requirements, but those of pine from the south Baltic countries and Russia have always been preferred by the British railroads, which have ordinarily been willing to pay a higher price for them than for ties made of other woods. The reason for this is that it is claimed by the railroad engineers that these ties will take creosote better than those from other countries. It is also claimed that Baltic pine ties will not split easily when the spikes that hold the rail chairs are driven in. Another point in their favor is that owing to the resiliency of the wood any slight unevenness in manufacture will adjust itself by the weight of the train. Next to the Baltic States, pine ties from Archangel are preferred, although, on account of the wood being of a softer texture, it is not considered their equal for wearing quality, also it is so free from knots that it splits more easily; strange as it may seem, small or medium-sized tight knots are desired in ties by the British railroads.

However, with the campaign to encourage trade within the Empire, which has been so much to the forefront during the past two years, pressure has been brought upon the railroads to buy more of their lumber requirements from the Dominions so that there is a tendency toward the greater use of Douglas fir, and alternative prices are now being asked for on all tenders for railroad ties. The following table shows the countries furnishing railroad ties to the United Kingdom during 1925.

Country	Quantity	Value
	Loads	
Poland (including Danzig)	199, 252	£1, 026, 388
Russia	84, 378	366, 740
Canada	51, 521	251, 285
Latvia	41, 168	201, 021
United States	36, 193	173, 949
Sweden [1]	20, 144	92, 083
Estonia	4, 459	19, 600
Finland [1]	2, 399	£13, 896
France [1]	2, 127	7, 292
Germany	1, 763	8, 911
Australia	1, 238	13, 937
All other	6, 682	32, 326
Total	451, 324	2, 207, 428

[1] Colliery ties only.

Poland (including Danzig), Russia, Latvia, Estonia.—Ties from these countries are made of north European pine, which is similar in growth and texture in all of them with the exception of Russia. Russian pine is milder in texture and has fewer knots, and ties made from it are not considered as good as those made in the other countries mentioned. The ties are usually hewn from small trees and shipped to the United Kingdom mostly as square blocks, and sawn down the middle through the heart center on arrival at the creosoting plants. These are called, in the British lumber trade, "sleeper blocks." In addition, small quantities are imported, already sawn in two, which are called "half blocks." These countries supply the bulk of the British crosstie requirements.

Canada and the United States.—All the ties imported from these countries are of sawn Douglas fir. Before the war practically all the ties used in the United Kingdom were 9 feet long, but when supplies could no longer be obtained from the north European countries the standard 8-foot 6-inch tie was introduced from Canada and the United States and has now practically replaced the longer one. In pre-war days crossties of southern pine were imported, but the increased value of that species has eliminated its use for this purpose and none have been received for several years.

Other countries.—Of the other countries supplying ties, Sweden, Finland, and France ship small quantities of small hewn ties for underground trams in the collieries. Germany also ships occasional parcels of railroad ties, while a few of jarrah have been received from Australia for use on the London subways where they, not being subjected to changing climatic conditions, are laid untreated.

PORTS OF ENTRY

The port of entry for railroad ties is determined almost entirely by the creosoting facilities available. These treating plants are operated by both the railroads themselves and private individuals, but as the former's equipment is not sufficient to take care of their needs, considerable quantities of treated ties are purchased from private companies.

The principal ports of entry are Liverpool (Garston and Birkenhead, none are received at Liverpool proper), London, Grimsby, Southampton, Grangemouth, West Hartlepool, Boston, Port Talbot, Lowestoft, Sunderland, Newport (Monmouthshire), Cardiff, and Plymouth.

METHODS OF TRADE

Railroad ties are handled the same as other lumber items, by agents acting as sales representatives for the foreign shipper, on a commission basis. These, however, do not sell direct to the railroads, as such procedure would be considered unethical, but confine their business to recognized importers. These importers in turn sell to the railroads, who cover their needs by means of public tenders. The railroad-tie business is a highly specialized branch of the British lumber trade and is in the hands of a comparatively few companies, most of which operate treating plants and are thus in a position to supply either treated or untreated stock as required. American exporters, therefore, interested in this business should not attempt to quote the railroads direct but should submit their offers through a recognized agent.

SPECIFICATIONS, CONDITIONS, AND PRICES

The standard gauge of railroads in Great Britain is 4 feet 8½ inches, for which a crosstie of 8 feet 6 inches is used. While they have not been standardized, the following specification requirements and conditions under which one of the leading railroad groups purchase their tie supplies may be taken as generally applying to all, with the exception of the amount of wane admitted, which is variable.

SPECIFICATIONS

1. The ties shall be of good, sound, well-grown Baltic redwood (pine) timber, straight grained, reasonably free from sapwood, free from shakes, large, loose and unsound knots, dead wood, and other defects.

2. They shall be cut from hewn or sawn blocks measuring in section 10 by 10 inches or 12 by 12 inches, according to the dimensions of the tie. In the case of the smaller blocks they shall be sawn up the center, but the larger blocks may have a piece 2 inches wide cut out of the center to produce two ties.

3. The ties shall be straight with square ends, and rectangular in section except the wane not exceeding 1 inch on each of the edges of one wide face will be allowed, both edges of the opposite wide face being square. They shall be 8 feet 6 inches long, 10 inches wide, and 5 inches deep, but a quantity not exceeding 10 per cent may be 12 inches wide by 5 inches deep if so required by the railway company. No tie shall be less than the specified length or exceed that dimension by 2 inches or vary from the specified width and depth by more than ¼ inch.

4. The company is prepared to consider the acceptance of an alternative tender on the basis of a quantity of the ties supplied under the contract, not being more than 10 per cent of the total, having wane not exceeding 1½ inches on each of the two edges of one of the wide faces, both edges of the opposite face being square.

5. The ties may be imported sawn, but other things being equal, the company is prepared to give preference to tenders which provide for the blocks being imported whole and the sawing done by the contractors at the port of delivery.

6. The ties shall be inspected after arrival at the respective points of delivery set out in the attached tender form by the company's representative, who will reject all that are not in accordance with the specification.

All extra labor involved in handling the ties for the purposes of inspection shall be supplied by and at the expense of the contractor.

7. All rejected ties must be removed free of all expense to the company by the contractor within one calendar month of the advice of such rejection, and the contractor must also at his own expense replace all such rejections with satisfactory timber. A charge of ½d. per tie per week, or part of a week, will be made for all rejected ties not removed within the specified period.

8. The ties shall be handed over free on quay alongside ship, free on rail, or stacked free on barge, at the respective points of delivery set out in the attached tender form, according to the terms arranged when the contract is entered into, by the ------ day of ------ 19--, and the contractor shall pay all charges thereon, including all insurances and all dock dues, as also all wharfage on the cargo, carriage on the ties (if any) to the point of delivery, and all other charges and expenses of every kind which may be incurred in connection with the cargo until handed over to the company.

Should any demurrage on wagons or barges be incurred through the contractor not loading them up with sufficient celerity or in consequence of his not making deliveries in sufficient quantities, or from any other cause, all such demurrage cost must be borne by him.

Any charges which the company may have to pay in consequence of any act or default on the contractor's part shall be deducted from any money due to the contractor by the company.

9. Should the contractor fail to supply the ties ordered or replace those rejected within the specified period, the company reserves the right to obtain supplies elsewhere, charging the loss, if any, to the contractor. Should the contractor commit a breach of contract the company shall, either before or after the exercise of the power above mentioned, be at liberty to terminate the contract by notice in writing to that effect, the contractor being held liable for all loss or damage arising from such breach.

10. Tenders are to be made at a price per tie, which price is to include every expense whatever attending the supply, loading into wagons or barges or otherwise as contracted for, railway and land carriage, and delivery of the ties at the depot or wharf named in tender form.

11. Any question as to whether any of the ties supplied under the contract are not in accordance with the terms of the specification shall be determined by the engineer in his absolute discretion, and his decision shall be final and binding on both parties.

12. The company do not bind themselves to accept the lowest or any tender, or to make a contract for the full quantity of ties offered. In the event of the number of ties to be supplied under the contract being reduced below that tendered for, the period given for the completion of the contract shall be reasonably, reduced.

As already mentioned, there is no uniformity among the railroads as to the amount of wane admitted, large quantities being bought on a basis of 60 per cent, not exceeding ½ inch on each edge of one face and 40 per cent 1 inch, both edges of the opposite face being square.

While the square blocks are preferred to ties, at some ports it is not convenient to have them resawn, in which event they are imported cut to finished size, which is 8 feet 6 inches, 10 by 5 inches. At the rail joints, however, 12 by 5 inch ties are used, one being laid on each side of the joint, which lies exactly halfway between them.

During the summer of 1927 the market value of an 8 foot 6 inch, 10 by 10 inch Baltic pine block was approximately 10s., c. i. f. United Kingdom.

Ties used in Ireland, both in the northern part and in the Irish Free State, are 9 feet long, 10 by 5 inches, owing to the standard gauge in that country being 5 feet 3 inches.

Rails of various lengths are used by the British railroads, but recently one of the leading groups has adopted a standard length of 60 feet, while the remaining groups have adopted a standard length of 45 feet.

COLLIERY TIES

The coal mines of the United Kingdom use large quantities of untreated small ties 3 feet and 3 feet 6 inches long, 3 by 6 inches, 2½ by 6 inches, and 2½ by 5 inches for their underground tramways. Most of these are made of native softwoods, but a few are imported, generally combined with shipments of pit props. Sweden is the principal country furnishing these, with small quantities from Finland and France. In addition to these tram ties the collieries also use regular sized ties for their above-ground tracks and sidings, but they, as a rule, do not buy first quality stock, filling their requirements from culls rejected by railroad inspectors on account of excessive wane.

SWITCH TIES

Switch ties or "crossings" are used at switches or "points," as they are called in the British Isles, to support 4 or 6, and sometimes more, rails. The usual sizes are 6 by 12 inches and 7 by 14 inches, 10 to 18 feet long, rising in multiples of 6 inches, although as long as 30 feet may occasionally be used. They are generally imported from northern Europe in 12 by 12 inch and 14 by 14 inch hewn blocks and sawn in two on arrival. In addition to these some 6 by 14 inch switch ties are used by one of the big railroads. In placing their orders for switch ties the British railroads always specify the quantity of each length to be furnished, i. e., so much 10 feet and 10 feet 6 inches, etc. During the summer of 1927 the market price for Baltic pine switch-tie blocks was approximately 97s. 6d. per load, c. i. f. United Kingdom. Some of this stock, however, is either sawn southern pine or Douglas fir, the larger size being somewhat difficult to obtain in north European pine.

The following specification for Baltic pine switch ties is issued by one of the leading British railroads:

1. The timbers shall be of good, sound, well-grown Baltic redwood (pine) timber, straight grained, reasonably free from sapwood, free from shakes, large, loose, and unsound knots, dead wood, and other defects, wane being allowed to the extent hereinafter specified.

2. They shall be 12 by 6 inches, 14 by 6 inches, 16 by 6 inches, or 18 by 6 inches, section in lengths varying from 9 feet to 28 feet as required by the engineer.

The variation in the length of any piece above or below that specified must not exceed 2 inches, while the variation from the specified width and depth must not exceed ¼ inch.

Full particulars of the number of pieces of each section and their respective lengths will be supplied to the contractor following the acceptance of his tender.

3. The timbers shall be reasonably free from boxed hearts and have square edges and ends, except that a quantity, not exceeding 30 per cent of the total supplied, may have wane at each of the two edges of one of the wide faces to an extent not exceeding 1 inch, both edges of the opposite face being square.

OUTLOOK FOR AMERICAN TIES

Although since the matter was raised at the last Imperial Conference alternative bids are now being asked for Baltic pine and British Columbian pine (one of the names by which Douglas fir is known) on tenders issued by the British railroads, it is doubtful if the former will be replaced to any great extent unless there is a considerable difference in price. At equal or even 3d. per tie more it is considered by those close to the situation that the bulk of the ties used will continue to be of Baltic pine. However, even should a greater portion of this business be placed in Douglas fir the bulk will probably go to British Columbia, unless materially lower prices from the United States makes it impossible for the railroad companies to ignore tenders for stock from that country.

PIT PROPS AND MINING TIMBER

As a large coal-producing country, Great Britain imports great quantities of pit props, which may be either pine or spruce, both selling at the same price, to supply the needs of the mining industry, the imports being governed very largely by the activity in the pits. Since the war the annual production of coal in Great Britain has averaged between 225,000,000 and 270,000,000 long tons, except when reduced by strikes, and it is estimated that it takes from 2 to 2½ tons of timber and pit props, largely the latter, to produce 100 tons of coal.

It will be noted in the following table, which shows the imports of pit props, in loads of 50 cubic feet each, into the United Kingdom, that there was a large falling off in imports during 1926, due to the coal stoppage in Great Britain from May to November in that year.

Year	Quantity	Value	Year	Quantity	Value
	Loads			*Loads*	
1913	3,451,328	£4,445,066	1923	3,675,120	£7,679,764
1919	1,451,733	7,307,939	1924	3,004,269	5,911,646
1920	2,003,937	9,369,122	1925	2,503,447	4,594,554
1921	1,296,925	3,224,152	1926	1,583,919	2,990,886
1922	2,811,876	5,486,308			

NOTE.—This table does not contain imports of round and partly squared mining timber, which are included in the classification "Round and hewn softwood."

COUNTRIES OF ORIGIN

France, Finland, Sweden, Russia, and Norway are the principal countries furnishing pit props, those from France being used almost entirely in the South Wales district.

Small quantities are also obtained from Newfoundland, in 1925 a total of 42,870 loads, valued at £124,498 being received. Since that time they have practically ceased, the wood being more profitable for pulping purposes.

The following table shows the country of origin of the imports of pit props into the United Kingdom, in loads of 50 cubic feet, during the year 1925:

Country of origin	Quantity	Value	Country of origin	Quantity	Value
	Loads			*Loads*	
France	1,231,968	£1,551,008	Latvia	48,411	112,471
Finland	533,914	1,260,870	Germany	43,528	106,379
Sweden	284,093	698,411	Newfoundland	42,870	124,498
Russia	133,681	332,786	All other	39,383	67,056
Norway	94,769	232,370			
Estonia	50,840	108,705	Total	2,503,447	4,594,554

The principal reason for the large import from France is that pit props are carried as return cargo by vessels that have taken out British coal to the southern French ports. There being no other return freights, it is a question of pit props or ballast so that a very low rate of freight is accepted. Although France is a large producer of coal, the mines are located in the northern part of the country and a considerable distance from the southwestern district, which supplies the timber that furnishes the props. It is therefore cheaper for that section of France to use imported coal transported by water from Great Britain rather than pay the heavy railroad charges on that produced in their own country.

SPECIFICATIONS AND UNIT OF SALE

French pit props are usually imported "unpeeled," i. e., with the bark on, and sold per ton of 2,240 pounds ex ship. The diameters of an ordinary specification are as follows: 6½ feet, 4 to 8 inch tops (inside bark); 9 feet, 5 to 9 inch tops (inside bark); 13 feet, 8 to 12 inch tops (inside bark).

Pit props from the north European countries, on the other hand, are imported "peeled"—i. e., without bark—and may be obtained in any length up to 13 feet, but are usually 7 and 8 feet, 2-inch tops and up, but 4-inch tops and up are most general.

Sales from Sweden and Finland are effected per English fathom 6 by 6 by 6 feet or 216 cubic feet when sold on f. o. b. loading port terms, but c. i. f. sales are invariably on the Goteborg scale standard, while those from Russia, Norway, the Baltic, and Germany are all sold on a c. i. f. basis per English fathom.

In addition to the props, a small quantity of round unpeeled mining timber (an average specification usually calling for 10 feet and up in length, 4 inches and up top diameter) and some partly squared timber is imported from the Scandinavian countries, the former being sold per load of 50 cubic feet tape measure, "Hoppus" system, and the latter per load caliper measure.

METHODS OF MEASURING

In computing the contents of pit-prop cargoes sold per English fathom f. o. b., they are measured at the port of loading, while those sold c. i. f. the measuring is done on the dock or wharf at the port of discharge. Sometimes, however, space is not available, in which event the piling for measurement is done in the buyer's yard.

To facilitate the calculation of Goteborg scale standard, certain scales have been compiled from actual tests, hence the term "Goteborg scale standard." The scales give the top diameter of the piece, and for each dimension the number of running feet required to make up one standard of wood of this particular diameter. The procedure of the measurers is to measure the top diameter and the length of the wood, multiply by the number of pieces of the same dimensions and divide the result by the number of running feet given on the scale under the diameter in question. The following statement gives the linear feet of props per Goteborg standard of 180 cubic feet:

Top diameter:	Linear feet
2 inches	3, 580
2½ inches	2, 540
3 inches	1, 800
3½ inches	1, 440
4 inches	1, 116
4½ inches	936
5 inches	792
5½ inches	648
6 inches	540
6½ inches	468
7 inches	396
7½ inches	340
8 inches	288
8½ inches	260
9 inches	220

In computing the contents of "unpeeled" mining timber, "Hoppus" system, the measurement is taken under the bark, a strip being taken off in the middle of the log for this purpose.

The question of measurement is a frequent cause of dispute in the pit-prop trade and as a result it is now customary for 10 per cent of the payment made by buyers to be held by the bank presenting the documents until the measurement is ascertained by the Customs Fund measurers, such measurement being accepted by both sellers and buyers.

PRICES

The market for pit props constantly fluctuates and varies almost from day to day. However, to give an idea of the value of these and also mining timber on the market, the following approximate prices are given:

Pit props.—French, 29s. 6d. to 30s. per ton of 2,240 pounds ex ship South Wales ports. Finland and Sweden, 63s. to 67s. per English cubic fathom of 216 cubic feet f. o. b.; 102s. 6d. to 107s. 6d. per Goteborg scale standard for a specification consisting of 4 inches and up tops, c. i. f. east coast ports for f. o. w., 1928 shipment; there has been an absolute dearth of inquiry for 2½ to 3½ inch tops, and as low as 80s. per Goteborg scale standard has been accepted for these. Russia, Estonia, and Latvia, 117s. 6d. to 120s. per piled cubic fathom for a specification of 4 inches and up tops c. i. f. Norwegian prices are generally slightly less than Swedish.

Round mining timber.—55s. per load of 50 cubic feet c. i. f. east coast ports, tape measure.

Partly square timber.—39s. to 40s. per load of 50 cubic feet c. i. f. east coast ports, caliper measure.

DIMENSION STOCK

The increased cost not only of raw material but also of transportation and handling charges and conversion since the war has greatly stimulated interest in the purchase of dimension stock in the wood-consuming industries, particularly those operating on a mass-production scale in Great Britain. While no statistics are available, there is no doubt that imports of lumber cut to rough sizes have greatly increased during the past few years. Strange to say, the automobile industry, where one would expect to find the dimension idea most fully developed, has so far shown little interest in its use.

HARDWOODS

Principal species and uses.—By far the largest consumer of dimension stock is the furniture industry, the majority of the imports going to it. Oak is the species most called for and is imported from the United States, Czechoslovakia, Poland, and Yugoslavia. It is used principally for legs of chairs, tables, wardrobes, and dressing tables. Beech, from continental Europe, principally Czechoslovakia, is used for the same purposes in less expensive furniture and is generally stained to resemble the more valuable woods. It is also used extensively for garden furniture, deck chairs, and camp stools.

For many years hickory dimension has been imported from the United States for golf shafts, shunting poles, and picker sticks, but the demand is limited and any considerable increase is improbable.

In addition to these, a very small quantity of birch squares is imported from Finland for furniture and broom handles, but the competition from lumber and logs shipped from the Canadian Maritime Provinces has reduced the sale of the former to very small proportions.

Chief complaints.—The chief complaints made against American oak dimension—the item most capable of development—by the import trade are faulty manufacture, insufficient seasoning, and worms.

The matter of size is of great importance, as even ¼-inch scant will make the piece of no value; and it is absolutely essential that the stock be cut full enough to dry out to the exact sizes ordered. There is no cutting down to the next size or regrading in dimension stock; it is either a perfect piece or a cull.

Another great difficulty in dimension is the liability of the stock to warp and twist if not thoroughly seasoned before shipment, and either warping or twisting is sufficient to make the piece unusable. It must be straight from end to end and absolutely flat.

During the summer of 1927 many parcels of dimension arrived with worms actively at work, causing heavy claims to be made against the shippers. Not only is the damage to the lumber itself a serious matter but there is also danger of these pests spreading to other piles in the yard. While the presence of worms can not always be detected at the mill, the greatest care should be taken by exporters interested in dimension business to examine the stock before shipment; otherwise, should worms be detected on arrival, it is quite possible that the whole parcel may be rejected on the dock and become a total loss.

Every arrival of wormy stock from the United States is a boost for central European lumber, in which this defect is unknown; so that while the individual loss on account of allowances may be great the arrival of wormy lumber discredits the entire American dimension trade in the British mind.

Future outlook and American participation.—According to figures issued by the United States Department of Commerce, there was exported to the United Kingdom during 1926 a total of 666,000 feet board measure of hardwood dimension stock, valued at $94,325. These exports consisted largely of oak and hickory squares and a small quantity of maple piano rails.

It can not be said that these figures are satisfactory in view of the potentialities of this market, and it would appear as if American exporters are not taking full advantage of its possibilities. Several reasons might be advanced as to why the trade in dimension stock with the United Kingdom has not advanced more rapidly, but perhaps the main reason is that it has been considered by many manufacturers merely as a side line of a lumber business instead of a separate branch. The dimension trade is no haphazard business, and, as a result of this attitude, shipments have arrived on which heavy claims have been paid and the shipper, after one or two preliminary orders, has quit, deciding there is no money in it. He is right; there is no money in dimension business conducted in that manner, and the result was inevitable from the start. However, there are others whose experience has been quite different. Such firms have made a speciality of dimension business, buyers have confidence in their shipments, and, as a result, their brands have gained such a reputation that a premium is always obtained for their stock.

With the advance in mass-production methods, the use of dimension stock by the consuming industries is likely to grow, and careful inquiries among them and the import trade have failed to reveal any objection to it. The extent, however, to which the United States will participate in this trade is largely in the shippers' own hands; and while the shipping of well manufactured, thoroughly seasoned stock is essential, that, in itself, is not sufficient. The demand for dimension must be created and the British consuming industries educated in the advantages of using it by means of literature and by advertising in the trade press, and the efforts of exporters' agents must be supported to the fullest extent. If this is done, the results desired are sure to follow and the future will see a marked increase in imports of hardwood dimension from the United States.

SOFTWOODS

According to statistics American exports of softwood dimension stock during 1926 to the United Kingdom amounted to 977,000 feet, valued at $53,536. These, however, consisted largely of floor blocks (which have been covered in the section on flooring) and a small amount of broom-handle squares.

The British market for softwood dimension, excluding floor blocks, is comparatively small, being practically limited to broom-handle squares, the great variety of lumber sizes imported from northern and continental Europe filling almost every need of the consuming industries.

Broom-handle squares must be straight grained, free from knots, curls, twists and shakes, thoroughly dry, and full to size. They are imported principally in pine and spruce from Sweden, Finland, and Norway. The usual sizes are 1 by 1 inch, 1⅛ by 1⅛ inches, and 1¼ by 1¼ inches, in lengths of 48, 50 and 54 inches. On account of the expensive containers required and extra freight charges, it has not been found possible to ship turned handles so far. Broom-handle squares are imported in both first and second qualities, principally the former, the market value during the late summer of 1927 being approximately £22 15s. per standard, c. i. f., for the first and £19 15s. for the second quality. It is somewhat doubtful if there is any opportunity for America to participate in this business, which, after all, is only small. Price is the determining factor but if southern pine or Douglas fir squares can be delivered in Great Britain as cheaply as the north European product there is no reason why they should not be used as well.

VENEERS

Imported veneers are largely of the more valuable figured woods, such as mahogany, oak, walnut, and bird's-eye maple. Some okoumé (gabon) and American yellow poplar veneer are also imported and used as a base on which outer veneers of the decorative woods are laid.

The total quantity, however, is quite small, the British trade preferring to select its own logs and have the veneer made in local factories.

The total imports of veneer and panel wood—i. e., veneer cut to panel sizes—during 1925, amounted to 2,478 loads of 600 feet board measure valued at £118,906, the principal countries furnishing it being as shown in the following table:

Country	Quantity	Value
	Loads	
France	1,060	£53,664
United States	614	30,836
Germany	263	11,973
Austria	167	6,956
All other	374	15,477
Total	2,478	118,906

Of the above countries the imports from France consist principally of walnut and, to a smaller extent, of okoumé; while from the United States mahogany, oak, and walnut predominate. A large proportion of the veneer imports from the United States, however, consist of stock made by an American sewing-machine company at their own mills for use in their British branch so that the figures do not give a correct indication of the market. Imports from Germany consist largely of oak, together with small quantities of mahogany and okoumé, while Austrian veneers consist entirely of oak.

As the most important business is in the domestic manufactured product the various outlets for veneer are covered in the section on "Wood-using industries" under the title "Plywood and veneer."

POLING BOARDS

Poling boards are short boards, 1½ to 5 feet long and 6 to 9 inches wide, manufactured locally from "double wrack" and "firewood" quality of pine or spruce. They are used for shoring the sides of excavations dug in roadways for the purpose of laying sewers, water or gas pipes, and telephone cables.

ROUNDWOOD

Roundwood, usually the upper cuts of a tree, is imported in the form of peeled round logs principally from the White Sea district. Both pine and spruce is sold but contracts are usually for spruce with about 20 per cent of pine included. The usual specification for "roundwood" is 7 inches diameter at the small end (a small percentage of 6 and 6½ inches being allowed) by 7 to 10 feet long, the spruce being used principally for resawing into box lumber where an odorless wood is required, and in Scotland for herring barrel staves, while the pine is resawn into box lumber where an odorless wood is unnecessary. Contracts generally specify whether the stock is to be floated or unfloated, the latter being preferred and bringing a slightly higher price for the reason that floated timber will not make a tight barrel stave.

LATHS

Plasterers' laths are imported in large quantities into the United Kingdom, and the demand has been greatly stimulated by the large increase in house building during the past few years. They are manufactured from pine and spruce, mixed indiscriminately in the bundles, and are sold in first, second, and unassorted qualities. Finland, Sweden, and Latvia are the principal countries shipping laths to the United Kingdom, as it is practically the only outlet for them, and consequently there is considerable competition for business.

The consumption of laths, however, has been affected to some extent by the increased use of substitutes, such as wall board, which is being used to a greater degree than formerly, largely stimulated by the shortage of plasterers.

Laths are used both sawn and hand split, the former being sold per bundle of 500 running feet, and the latter per bundle of 360 running feet. Most of them, however, are sawn.

The usual dimensions of laths are 1⅛ by $\frac{3}{16}$ inch, 1 by ¼ inch, and 1 by $\frac{3}{16}$ inch (the most popular size), in lengths of 2½, 3, 3½, 4, 4½, and 5 feet.

Some rived or hand-split laths are made out of specially selected wood imported in half or part round billets which are free of centers.

FIREWOOD (SHORT LENGTHS)

The development of foreign markets for so-called "firewood" offers an excellent example of what the lumber manufacturers in northern Europe have done toward the elimination of waste and the promotion of a closer utilization of their raw material.

Firewood is not purposely manufactured but accumulates from the trimmings and defective parts cut out of lumber which, if not removed, would cause it to fall into a lower grade. This cutting is done as the lumber is being moved from the pile, where it has been seasoning, to the vessel for export. It will therefore be seen that the utilization of this material is a direct saving of what might otherwise go to waste, which loss would naturally have to be added to the cost of the lumber sold.

SOURCES OF SUPPLY

Large quantities of "firewood" are imported into Great Britain from Sweden and Finland every year, principally through London and east coast ports. The name, however, to-day is somewhat of a misnomer and is a carry-over from the days when the use of this wood was entirely for the purpose its name would indicate. With the advance in its value that has taken place since the war very little is imported for kindling purposes now, but the old name is still used in the lumber trade.

SPECIES, GRADES, SIZES, AND USES

Firewood may be either of pine or spruce and is imported in two qualities known as "first" and "second" quality.

First quality is used entirely for box making and cheap kitchen furniture, the sizes being as follows:

Deal and batten ends.—2, 2½, 3, 3½, and 4 inches by 6, 6½, 7, 7½, 8, 9, 10, and 11 inches and wider; 1, 1½, 2, 2½, 3, 3½, 4, 4½, 5, and 5½ feet long.

Scantling ends.—Same thicknesses and lengths as deal and batten ends by 4, 4½, 5, and 5½ inches wide. Sometimes a small percentage of 3-inch widths is included.

Board ends.—1, 1¼, 1½, and 1¾ inches thick by 6 to 11 inches wide. Same lengths as above.

Planchette ends.—Same thicknesses and lengths as board ends by 4, 4½, 5, and 5½ inches wide. Sometimes a small percentage of ¾ and ⅞ inch thick is included.

Attention is called to the fact that pieces as short as 1 foot in length are included and that the lengths advance in multiples of 6 inches. Further, it will be noted that the lumber from which these short lengths are obtained is cut to the half inch in width and thickness for deals, battens, and scantlings, and the half inch in width and the quarter inch in thickness for boards and planchettes, which is evidence of the close utilization of the logs practiced by sawmills in the country of origin. It is said, however, that, in order to be profitable, shipments should contain not over 10 per cent of the quantity in 1-foot lengths. It must be sound and have one square edge. The other edge may have wane the entire length but not over 1 inch in width on pieces 6 inches wide, and proportionately on wider and narrower stock. Seasoning checks, as long as they do not go through the piece, and sound knots are not considered defects.

The sizes of second-quality firewood are the same as for first, the difference being in the defects allowed. It may have wane the entire length on both edges but not more than 1 inch in width on each edge on pieces 6 inches wide, and proportionately on wider or narrower stock. Knots and hard rot are not considered defects. A small percentage of soft rot is also permitted.

The increase in value of second-quality firewood has to a great extent prohibited its use for kindling, for which purpose it was originally used, and little is now imported as compared with pre-war years. Not all imported, however, is used for kindling, but the lumber is carefully sorted and pieces suitable for the cheaper grades of boxes, such as those used in the packing of fresh fish, are picked out. Again, a special trade has been developed for pieces 1¼ and 1½ by 5 inches and wider, 1½ to 5 feet long, known as "poling boards," which are selected from this grade and used for shoring the sides of street excavations for sewers, gas pipes, and electric cables.

Such lumber as is used for kindling is sold by the importer to the firewood merchants, who not infrequently operate a small box-making plant in conjunction with their firewood business. The firewood ends are cut into 5-inch lengths, split into narrow widths, and tied in bundles of 11¼ inches circumference. It is estimated that 8,000 bundles of these dimensions can be obtained from each fathom of firewood. The present selling price of this kindling wood is approximately 4s. per 100 bundles ex yard, or 5s. delivered at the retail store, where in turn it is resold at 8s., or if in small quantities at 1½d. per bundle. The principal retail stores handling kindling are the hardware and the grocery stores.

In addition to these, the sale and also the manufacture of kindling wood is done by several orphanages in London as a profitable means of keeping their boys employed. However, most of the kindling now sold in Great Britain is made from box works refuse, discarded wooden containers, or old secondhand lumber obtained from buildings being demolished.

IMPORT SALES METHODS

Both first and second quality firewood is sold by the fathom of 216 cubic feet (6 by 6 by 6 feet) but, in actual practice, a small allowance is made in measuring to take up the open spaces in the pile.

Purchases are made direct by the British importer from the exporter and contracts are usually placed at the end of the shipping season, about October, for shipment the following f. o. w. (first open water), which is usually about May 15 in northern Europe, where ice-bound harbors prevent exports during the winter months.

The difficulty in handling these short lengths at time of loading and also in discharging them in any sort of order has made firewood undesirable cargo for steamers, so that shipments are made almost exclusively in small sailing vessels. These have a capacity of 150 to 500 fathoms, the usual being about 300 fathoms.

Market prices.—The approximate market price for delivery in the spring of 1927 for first-quality deal and batten ends was £6 per fathom f. o. b. vessel, to which must be added £3 5s. to cover ocean freight to a United Kingdom port, making a total of £9 5s. cost and freight per fathom. Scantling and board ends are subject to a reduction of 10s. off deal and battens, while planchettes get an additional 10s. to 15s. off the scantling and board price.

Second quality is sold at a reduction of £2 per fathom under first.

AN OBJECT LESSON

Short, defective lumber similar to firewood is sent to the boiler or burner in many American sawmills, but the example of what Sweden and Finland are doing in turning it into money should cause manufacturers to think seriously.

While the same methods as are used in northern Europe may not be applicable to America, the example of what these countries have done with short lengths should be an incentive to American lumber manufacturers to seek avenues for the profitable disposal of similar stock which now is largely wasted.

POLES

Norway and Sweden are the principal countries furnishing the poles to the United Kingdom; in addition, small quantities are supplied by Russia and Finland.

The pole market in the United Kingdom is divided into telegraph and telephone poles, ordinary poles, rickers, boat hooks, and hop poles, and, with the exception of the first named, which must be of pine because they are always treated before being used, may be either of pine or spruce.

British statistics unfortunately do not segregate poles, but include them under the general classification of "hewn softwood," so that no accurate information is available as to the quantity imported each year. Except for a small quantity of mining timber (not to be confused with pit props), however, little of the wood included under this heading is "hewn," the total being made up principally of poles and "roundwood." (For information regarding the latter, see under that heading in this section.)

TELEGRAPH AND TELEPHONE POLES

The public telegraph and telephone systems in the United Kingdom are Government monopolies and, with the exception of small quantities purchased by the railroad companies who operate their own telegraph systems, the Government is the only buyer of poles for these purposes in this market. All purchases are made by the Post Office Stores Department, a copy of whose form or tender (which is printed in Swedish as well as English) is as follows:

Post Office Stores Department,
17–19 Bedford Street, London, W. C. 2.

Sir: You are invited to tender, subject to the "Conditions of contract" hereunto annexed, for the supply during next summer to His Britannic Majesty's Postmaster General of the red fir (pine) telegraph poles described in the schedule printed on page — hereof, the poles to be delivered at one or more of the following places, as may be directed by H. B. M. Postmaster General: Christie's Wharf, Charlton; Grays; Southampton; Newport (Mon.); Port Talbot; Ellesmere Port; Grimsby; Hull; Tyne Dock (River Tyne); Northumberland Dock (River Tyne); Methil (near Leven, Fifeshire,); Grangemouth; Belfast.

I am, sir, your obedient servant,

H. Sparkes, *Controller.*

NOTICE TO PERSONS TENDERING

1. Tenders are to be delivered by post or otherwise not later than ------ under cover marked and addressed as shown on the inclosed slip, and you are asked to state, in the space provided for the purpose, the date by which, in the event of your receiving an order, you would undertake to ship the poles. This form is to be returned intact.

2. His Britannic Majesty's Postmaster General does not bind himself to accept the lowest or any tender, and reserves to himself the right to accept any

part of a tender, but no person would be asked to send to any one port a less number of poles than would be required to make a small cargo.

3. Tenders must be for every size against which numbers are shown in column 2 of the schedule.

4. If a person tendering does not desire to tender for the full number of poles mentioned in the schedule, he may quote prices for such a smaller number as would suit his circumstances, but the number of each size tendered for should always be in equal proportion to the number shown in column 2 of the schedule. For example: If it is desired to quote for only one-fourth of the total number of poles shown in column 2 of the schedule, one-fourth of the number of every size of which supplies are required should be inserted in column 6. A single cargo, on the same basis, may be tendered for.

5. The prices inserted in thesc hedule must be stated as "per pole," as specified therein, and must be "net."

6. The tender of any person who has not already supplied His Britannic Majesty's Postmaster General with poles must be preceded or accompanied by butt sections, 2 inches thick, stamped with the shipper's mark, from not less than three poles, to show the quality of timber offered.

7. A second form is sent in order that the person tendering may retain a copy.

8. Any modification which a person tendering may desire to make in the "Conditions of contract," or otherwise, should be made only by means of a letter inclosed with the tender.

TENDER FOR TELEGRAPH POLES

To His Majesty's Postmaster General,
By the Controller,
Post Office Stores Department,
17–19 Bedford Street, London W. C. 2.

Sir: I, ---------- (hereinafter styled "the contractor") of ------ in the ------ of ------, hereby offer to provide and deliver the telegraph poles or any of them described in the schedule hereunto annexed, in the respective numbers stated in the third column of the schedule, which may on your behalf be ordered by the Controller, Post Office Stores Department, at the respective prices mentioned in the said schedule, subject in all respects to the terms and stipulations contained in the conditions of contract and specification hereunto annexed, and to ship the poles not later than the ------ day of ------ 19--, to any one or more of the following ports: Christie's Wharf, Charlton; Grays; Southampton; Newport (Mon.); Port Talbot; Ellesmere Port; Grimsby; Hull; Tyne Dock (River Tyne); Northumberland Dock (River Tyne); Methil (near Leven, Fifeshire); Grangemouth; Belfast; in your option, and I consent to this tender, holding good until ------ 19--.

Signature of person tendering----------
Address--------------------------------
Date------ 192

Witness:
Signature--------------------
Address--------------------

Contract No. ------

On behalf of His Britannic Majesty's Postmaster General, I hereby accept the foregoing tender for the supply of the telegraph poles described in the sixth column of the schedule hereunto annexed.

Controller, Post Office Stores Department, London.

Witness:

------------------------ 192--

CONDITIONS OF CONTRACT

1. *Quality.*—The poles to be supplied under the contract shall be of the description stated in the tender and shall conform in all respects to the specifications printed on the tenth and eleventh pages hereof.

2. *Delivery.*—The poles shall be shipped by the time stated in the tender, and be delivered by the contractor at his own expense; and he shall advise the receiving contractor by post when the steamer commences to load and by telegraph when the steamer leaves the port of loading.

Poles for the use of the post office may enter the ports referred to on payment of 75 per cent of the harbor dock and pier dues ordinarily payable thereat (other than canal tolls and payments for services, e. g., towage, cranage, water, light, power, labor, etc., all of which must be paid in full). If the contractor intends to avail himself of the exemption from 25 per cent of the ordinary harbor, dock, and pier dues, application for certificates of such exemption must be made to the Post Office Stores Department at the time of advising details of shipment.

All necessary payments in respect of harbor, dock, and pier dues, and payment in full of any canal tolls, or payments for services shall be made and borne by the contractor at his own costs and charges.

Where a consolidated rate is charged, inclusive of dues and other charges, the exemption applies only to the portion of the consolidated rate representing dues, the remainder of the consolidated rate being payable in full.

3. *Inspection and cut backs.*—The poles will, subject to the proviso to this clause, be inspected within 30 days after their arrival by an officer (herein called the inspecting officer) appointed for the purpose by His Britannic Majesty's Postmaster General and such poles as do not, in the opinion of the inspecting officer, comply with the specifications may be rejected, but the Postmaster General may at the cost of the contractor effect the following reductions in the lengths of poles shipped: (*a*) Poles shipped as 36 feet and under and poles shipped as 40 feet and over which exceed their proper specification lengths by more than 3 inches and 6 inches, respectively, may be cut back to their proper specification lengths; (*b*) poles shipped as 36 feet and under and poles shipped as 40 feet and over which fall short of their proper specification lengths by more than 3 inches and 6 inches, respectively, may be cut back to the next shorter specification lengths; (*c*) any pole which on account solely of defects at the top or butt is not acceptable at the length under which it is shipped may be cut back to the next shorter specification length acceptable to the Postmaster General. Provided always that if the inspection of any 500 poles taken consecutively from the cargo shall result in more than 100 rejections, the Postmaster General may then or any time thereafter discontinue the inspection and reject the entire cargo (except the poles, if any, already accepted) unless the contractor shall forthwith, at his own expense, sort the remainder of the cargo and select therefrom such poles as the contractor may find likely to be accepted, in which case the inspection of the poles so selected shall proceed.

4. *Payment.*—Payment by His Britannic Majesty's Postmaster General will be made within 21 days after the acceptance of the poles.

5. *Termination of contract.*—The Postmaster General may at any time by notice in writing determine the contract, as from the date of service of such notice, in any of the following events (that is to say): (*a*) If the contractor shall commit any breach of the contract; or (*b*) if the contractor shall become bankrupt or have a receiving order or order for the administration of his estate made against him, or shall take any proceedings for liquidation or composition under any of the bankruptcy acts for the time being in force, or make any conveyance or assignment of effects for the benefit of creditors, or if (in Scotland) the contractor shall become insolvent or notour bankrupt, or if any application be made under the present or any future bankruptcy acts for sequestration of the contractor's estate or if any application be made by the contractor or any of his creditors for cessio bonorum or a trust deed be granted by the contractor for behoof of creditors, or if the contractors, being a company, shall pass a resolution for or the court shall make an order for the liquidation of its affairs, or if a receiver for debenture holders shall have been appointed or circumstances shall have arisen which entitled the court or debenture holders to appoint a receiver. Provided always that such determination as aforesaid shall not prejudice or affect any right of action or remedy which shall have accrued, or shall thereafter accrue, to the Postmaster General under the contract.

6. *Bribery.*—Any bribe, commission, gift, loan, or advantage given, promised, or offered by or on behalf of the contractor, or any agent or servant of the contractor, in relation to the obtaining or to the execution of this or any other contract for His Majesty's service, or given, promised, or offered by or on behalf of the contractor or any agent or servant of the contractor, to any officer or person in the service or employ of the Crown, who shall be in any way connected with the execution of any such contract, shall subject the contractor to cancellation of all contracts which the contractor may hold for His Majesty's service, and also to payment of any loss resulting from any such cancellation. Any question or dispute as to a breach of this condition, or the sums to be paid, shall be settled by the Postmaster General in such manner and on such evidence or information as he thinks fit, and his decision shall be final. Attention is also drawn to the provisions of the prevention of corruption act, 1906, whereby corrupt transactions with agents are made punishable by fine and imprisonment.

7. *Notices to contractor.*—Any notice, demand, requirement, direction, or communication may be given or made to the contractor by being sent by registered post letter addressed to the contractor at his usual or last known place of abode or business, or (in the case of a company) at the registered office of the contractor, or by being left for the contractor there.

8. *Arbitration.*—In the event of any poles delivered by the contractor being rejected as aforesaid, whereby the contractor may consider himself aggrieved, a reexamination of such poles by an independent person or persons, to be mutually agreed upon by His Britannic Majesty's Postmaster General and the contractor, shall be allowed on application to the secretary, or the second secretary, of the British Post Office, and the party against whom the final decision is given shall pay the entire expenses of the arbitration.

9. *Members of Parliament.*—No Member of the House of Commons shall be admitted to any share or part of this contract or to any benefit to arise therefrom. (See House of Commons (disqualification) acts, 1782 and 1801.)

SPECIFICATION OF TELEGRAPH POLES

Description.—Swedish, Norwegian, Finnish, or Russian red fir (*Pinus sylvestris*), sound, hard grown (i. e., well hearted and with the annular rings closely pitched), straight, free from large or dead knots, especially knots forming a complete ring, and from other defects, and to have the outer and under bark completely removed.

To have been felled when the sap is down, and in no case earler than November 1, 1926, or later than March 1, 1927.

Each pole to contain the natural butt of the tree—i. e., to be sawn off as close to the ground as possible—and no timber whatever to be removed at the butt end, or trimmed or cut away from the butt end, so as to reduce its natural size, but this end to be sawn to give a flat section.

Dimensions to be in accordance with the subjoined table.

Mode of delivery.—All poles to be delivered carriage free either—

(*a*) Upon the wharf of the creosoters; or

(*b*) Upon some other wharf, if so directed by the Postmaster General; or

(*c*) Stowed into lighters provided by the creosoters, if it be impossible for the vessel to come alongside their wharf; or

(*d*) Loaded into railway trucks provided by the creosoters at the place of delivery, if the creosoting works are not accessible by water carriage; or

(*e*) Loaded into wagons or timber carriages provided by the creosoters at the place of delivery.

If the poles have to be floated or immersed in water after leaving the vessel in which they are imported they shall not remain so immersed longer than seven days.

Length	Sizes of light poles			Sizes of medium poles			Sizes of stout poles		
	Diameter at top		Minimum diameter at 5 feet from butt end	Diameter at top		Minimum diameter at 5 feet from butt end	Diameter at top		Minimum diameter at 5 feet from butt end
	Minimum	Maximum		Minimum	Maximum		Minimum	Maximum	
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
16 feet	5	5¾	6						
18 feet	5	5¾	6						
20 feet	5	5¾	6						
22 feet	5	5¾	6¼						
24 feet	5	5¾	6½	5½	6¾	8			
26 feet	5	6	6¾	5¾	7	8¼			
28 feet	5	6	7	5¾	7	8½	7½	9½	10½
30 feet	5	6	7¼	6	7¼	8¾	7½	9½	10¾
32 feet	5	6¼	7¼	6	7¼	9	7½	9¾	11
34 feet	5	6¼	7½	6	7½	9¼	7½	9¾	11¼
36 feet	5	6½	7¾	6	7½	9½	7½	9¾	11½
40 feet	5	6½	8	6	7½	9¾	7½	9¾	12
45 feet	5¼	6¾	8¾	6½	8	10¾	7¾	10	13
50 feet	5¼	7	9½	6½	8¼	11½	7¾	10¼	13¾
55 feet	5½	7½	10¼	7	8¾	12½	8	10½	14¾
60 feet	5½	7¾	11	7	8¾	13¼	8	10½	15½
65 feet	6	8	12	7	9	14	8	10½	16¼
70 feet	6½	8½	13	7	9¼	14¾	8	10½	17
75 feet	6¾	8¾	13½	7	9½	15½	8	10½	17¾
80 feet				7	9½	16¼	8	10½	18¾
85 feet				7	9¾	17½	8	10½	20

ORDINARY POLES, RICKERS, BOAT HOOKS, AND HOP POLES

In addition to those used for telegraph and telephone purposes large numbers of other poles are imported and are known in the trade as poles, rickers, boat hooks, and hop poles.

Ordinary poles are used principally for temporary scaffolding on buildings under construction and in shipyards. It is a curious sight to see, even on small buildings in course of erection, the most elaborate scaffolding of poles erected to support staging on which the workmen stand. Other uses are for flagstaffs and ladder making, those used for the latter purpose being specially selected for straightness of grain, taper, and freedom from knots.

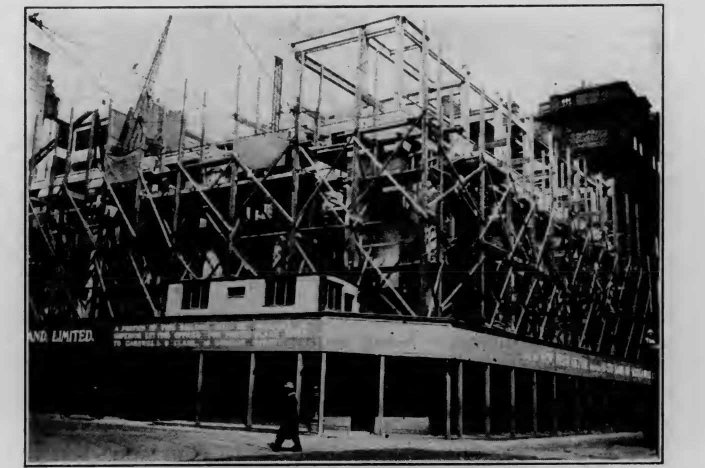


FIG. 24.—Elaborate scaffolding used in construction work

In addition to these purposes, specially selected spruce poles are used for yacht masts. According to one of the leading yacht builders in Great Britain, no other species has been found its superior for this purpose.

Rickers are small poles used principally for wireless aerials and flagstaffs on buildings. The use for boat hooks is obvious, while hop poles are short poles on which the vines are trained.

The principal ports of shipment for all of these are Oslo, in Norway, and Goteborg, in Sweden, but some are also shipped from other Swedish ports, such as Norrkoping, Stockholm, and Hernosand, and also from Finland and Russia.

Qualities.—Norwegian stock is preferred because poles from that country are graded as prime fresh straight, and second quality, while only one quality is shipped by the other producing countries. Very few of the second quality, however, come to the United Kingdom, the great majority being prime, so that it is natural they should be better than those from Sweden and the other countries where only one grade is shipped. A peculiarity of Oslo poles is that they are always shipped peeled at the butt end for about 9 inches, while all others have the bark left on for the entire length.

7. *Notices to contractor.*—Any notice, demand, requirement, direction, or communication may be given or made to the contractor by being sent by registered post letter addressed to the contractor at his usual or last known place of abode or business, or (in the case of a company) at the registered office of the contractor, or by being left for the contractor there.

8. *Arbitration.*—In the event of any poles delivered by the contractor being rejected as aforesaid, whereby the contractor may consider himself aggrieved, a reexamination of such poles by an independent person or persons, to be mutually agreed upon by His Britannic Majesty's Postmaster General and the contractor, shall be allowed on application to the secretary, or the second secretary, of the British Post Office, and the party against whom the final decision is given shall pay the entire expenses of the arbitration.

9. *Members of Parliament.*—No Member of the House of Commons shall be admitted to any share or part of this contract or to any benefit to arise therefrom. (See House of Commons (disqualification) acts, 1782 and 1801.)

SPECIFICATION OF TELEGRAPH POLES

Description.—Swedish, Norwegian, Finnish, or Russian red fir (*Pinus sylvestris*), sound, hard grown (i. e., well hearted and with the annular rings closely pitched), straight, free from large or dead knots, especially knots forming a complete ring, and from other defects, and to have the outer and under bark completely removed.

To have been felled when the sap is down, and in no case earlier than November 1, 1926, or later than March 1, 1927.

Each pole to contain the natural butt of the tree—i. e., to be sawn off as close to the ground as possible—and no timber whatever to be removed at the butt end, or trimmed or cut away from the butt end, so as to reduce its natural size, but this end to be sawn to give a flat section.

Dimensions to be in accordance with the subjoined table.

Mode of delivery.—All poles to be delivered carriage free either—

(*a*) Upon the wharf of the creosoters; or

(*b*) Upon some other wharf, if so directed by the Postmaster General; or

(*c*) Stowed into lighters provided by the creosoters, if it be impossible for the vessel to come alongside their wharf; or

(*d*) Loaded into railway trucks provided by the creosoters at the place of delivery, if the creosoting works are not accessible by water carriage; or

(*e*) Loaded into wagons or timber carriages provided by the creosoters at the place of delivery.

If the poles have to be floated or immersed in water after leaving the vessel in which they are imported they shall not remain so immersed longer than seven days.

Length	Sizes of light poles			Sizes of medium poles			Sizes of stout poles		
	Diameter at top		Minimum diameter at 5 feet from butt end	Diameter at top		Minimum diameter at 5 feet from butt end	Diameter at top		Minimum diameter at 5 feet from butt end
	Minimum	Maximum		Minimum	Maximum		Minimum	Maximum	
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
16 feet	5	5¾	6						
18 feet	5	5¾	6						
20 feet	5	5¾	6						
22 feet	5	5¾	6¼						
24 feet	5	5¾	6½	5½	6¾	8			
26 feet	5	6	6¾	5¾	7	8¼			
28 feet	5	6	7	5¾	7	8½	7½	9½	10½
30 feet	5	6	7¼	6	7¼	8¾	7½	9½	10¾
32 feet	5	6¼	7¼	6	7¼	9	7½	9¾	11
34 feet	5	6¼	7½	6	7½	9¼	7½	9¾	11¼
36 feet	5	6½	7¾	6	7½	9½	7½	9¾	11½
40 feet	5	6½	8	6	7½	9¾	7½	9¾	12
45 feet	5¼	6¾	8¾	6½	8	10¾	7¾	10	13
50 feet	5¼	7	9½	6½	8¼	11½	7¾	10¼	13¾
55 feet	5½	7½	10¼	7	8¾	12½	8	10½	14¾
60 feet	5½	7¾	11	7	8¾	13¼	8	10½	15½
65 feet	6	8	12	7	9	14	8	10½	16¼
70 feet	6½	8½	13	7	9¼	14¾	8	10½	17
75 feet	6¾	8¾	13½	7	9½	15½	8	10½	17¾
80 feet				7	9½	16¼	8	10½	18¾
85 feet				7	9¾	17½	8	10½	20

ORDINARY POLES, RICKERS, BOAT HOOKS, AND HOP POLES

In addition to those used for telegraph and telephone purposes large numbers of other poles are imported and are known in the trade as poles, rickers, boat hooks, and hop poles.

Ordinary poles are used principally for temporary scaffolding on buildings under construction and in shipyards. It is a curious sight to see, even on small buildings in course of erection, the most elaborate scaffolding of poles erected to support staging on which the workmen stand. Other uses are for flagstaffs and ladder making, those used for the latter purpose being specially selected for straightness of grain, taper, and freedom from knots.

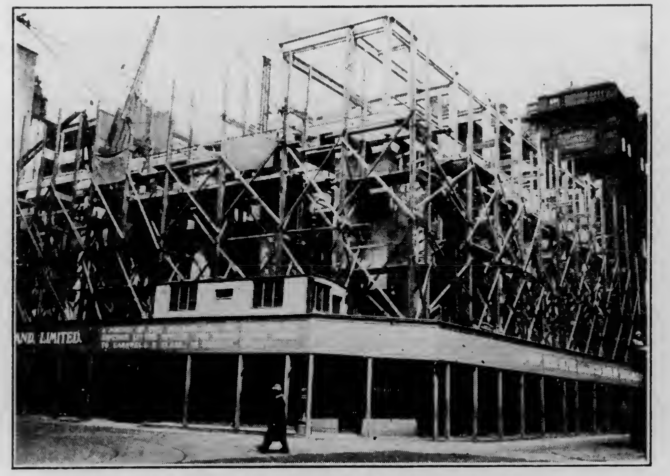


FIG. 24.—Elaborate scaffolding used in construction work

In addition to these purposes, specially selected spruce poles are used for yacht masts. According to one of the leading yacht builders in Great Britain, no other species has been found its superior for this purpose.

Rickers are small poles used principally for wireless aerials and flagstaffs on buildings. The use for boat hooks is obvious, while hop poles are short poles on which the vines are trained.

The principal ports of shipment for all of these are Oslo, in Norway, and Goteborg, in Sweden, but some are also shipped from other Swedish ports, such as Norrkoping, Stockholm, and Hernosand, and also from Finland and Russia.

Qualities.—Norwegian stock is preferred because poles from that country are graded as prime fresh straight, and second quality, while only one quality is shipped by the other producing countries. Very few of the second quality, however, come to the United Kingdom, the great majority being prime, so that it is natural they should be better than those from Sweden and the other countries where only one grade is shipped. A peculiarity of Oslo poles is that they are always shipped peeled at the butt end for about 9 inches, while all others have the bark left on for the entire length.

SPECIFICATIONS AND PRICES

Ordinary poles, rickers, boat hooks, and hop poles may be either pine or spruce, and the following sizes are imported, the market value c. i. f. any regular United Kingdom port for prime Oslo stock during the spring of 1927 being as indicated.

Poles.—The sizes and prices of poles are shown in the following table:

Middle diameter	Length in feet	Average diameter at top	Price
		Inches	
3 to 4 inches	24 and up, 26 to 28 average	2	1⅞d. per linear foot.
Do.	26 to 28	2	1½d. per linear foot.
Do.	26 to 28	2	1¾d. per linear foot.
Do.	24 to 30	2	Do.
4 to 6 inches	24 to 30	2½	1⅞d. per linear foot.
Do.	26 to 27 average, 24 to 38	2½	2¼d. per linear foot.
Do.	24 and up, 31 to 32 average	2½	Do.
Do.	28 to 42	2½	Do.
Do.	31 to 32	2½	2⅛d. per linear foot.
Do.	32	2½	Do.
Do.	35	2½	7s. 3d. each.
Do.	35 to 45, average 40	2½	2½d. per linear foot.
Do.	36 to 45, average 40	2½	2$\frac{1}{16}$d. per linear foot.
Do.	42	2½	9s. 6d. each.
Do.	40 to 55	2½	2¾d. per linear foot.
Do.	40 to 60[1]	2½	3¾d. per linear foot.

[1] These are the principal lengths specially selected for ladder making.

Rickers.—Generally speaking rickers are shipped in the following sizes, no middle diameter being required as in poles: 18 to 21 feet long, 2-inch top diameter, 1s. 9d. each; 22 feet long, 2-inch top diameter, 2s. 4d. each; 28 feet long, 2-inch top diameter, 3s. 2d. each; 22 feet long, 2½-inch top diameter, 3s. 4d. each; 28 feet long, 2½-inch top diameter, 5s. 6d. each.

Boat hooks.—These are shipped 12 to 15 feet long, 1-inch top diameter, and 16 to 19 feet, 1 to 1¼ inch top diameter, and were valued at 8d. and 1s. each, respectively, c. i. f.

Hop poles.—These are 9 to 11 feet in length by 1-inch top diameter, and sold at 5½d. each, c. i. f.

SLATING AND TILE BATTENS

Large quantities of slating and tile battens are used annually in the United Kingdom for house construction. These battens are small pieces of lumber upon which the slates or tiles are fastened. They are imported principally from Sweden, Finland, and Norway, and are of both pine and spruce. Sometimes they are sold in mixed species, while at others each is sold separately.

Two qualities only are sold unsorted (first, second, third, and fourth) and fifth, in the following sizes: 3 by ¾ inch, 3 by ⅝ inch, 2½ by ¾ inch, 2½ by ⅝ inch, 2 by 1 inch, 2 by ¾ inch, 2 by ⅝ inch, 1¾ by ¾ inch, 1¾ by ⅝ inch, 1½ by 1 inch, 1½ by ¾ inch, 1½ by ⅝ inch, 1¼ by ¾ inch, 1¼ by ⅝ inch, 1 by 1 inch, 1 by ¾ inch, 1 by ⅝ inch.

Of these the 2, 1½, 1¼, and 1 inch are in most demand. The lengths are the same as lumber, 9 feet and longer, with ends 6 to

8 feet, sometimes 5 to 8 feet, which sell at two-thirds the price of regular lengths. During the early summer of 1927 the market price for this stock was £15 10s. per standard c. i. f. London or regular east coast port.

SHINGLES

A shingled house is practically unknown in the British Isles, and although on several occasions efforts have been made to develop a market for western red cedar shingles, little progress has been made and it is doubtful if they ever will take the place in Great Britain of slate and tile, with which the vast majority of the homes are roofed. Occasionally an American resident may ask that a shingled roof be put on his home, but these instances are so rare as to be unique.

The only possible outlet would seem to be for the roofs of small ornamental summer houses, frequently seen in the gardens of the better class, but even for these straw thatch is preferred, although even here the question of obtaining help with the necessary skill in laying is a serious handicap. If the other obstacles could be overcome, it is doubtful whether municipal regulations would permit the use of shingles in many communities on account of the alleged fire hazard, so that, apart from summer houses, there is little likelihood of any demand being developed.

While advertising in architects', building, and other journals catering to the "home beautiful" might be of value, it is, taking all factors into consideration, doubtful if more than small quantities of shingles will ever be sold in Great Britain.

WOOD-CONSUMING INDUSTRIES

BUILDING AND CONSTRUCTION

Although wood enters into house construction only to a very small extent in Great Britain, the building and construction industry is by far the greatest wood-consuming industry. Pine and spruce from northern, eastern, and central Europe are the principal woods used and, to a small extent, spruce from Canada.

For many centuries brick has been the favorite building material, and although the era of steel and concrete is replacing it for heavy construction work and large buildings, it is doubtful if it ever will be supplanted for ordinary residences.

American woods enter very little into building and construction work except where large sizes and long lengths are required, in which event southern pine and Douglas fir are used.

POSTWAR HOUSING SHORTAGE

The end of the war found a great shortage of houses in the United Kingdom, caused by the complete cessation of building during the four years that it lasted. It soon became evident that there was no possibility of overtaking the arrears through private enterprise, so in order to stimulate the building of houses, primarily those for the wage-earning classes, Parliament, in 1919, provided that subsidies for this service might be given both to municipal authorities and to private builders.

Government subsidy.—Under the provisions of the housing act, 1923, and the housing (financial provisions) act, 1924, the ordinary rates of subsidy in respect of qualified houses were as follows:

£6 per house per annum for 20 years in respect of houses not subject to special conditions as to rents, etc.

£9 per house per annum for 40 years for houses subject to special conditions and situated in a nonagricultural district.

£12 10s. per annum per house for 40 years for houses subject to the special conditions and situated in an agricultural district as defined by the act.

According to the act, however, the rates of subsidy were fixed for houses built during the first two years only. After October, 1926, and each two-year period thereafter, the position was to be reviewed; and if, after consultation with local authorities, the cost of building and other conditions warranted, the subsidy for houses built during the next two-year period would be reduced. In accordance with this provision, on October 1, 1927, the subsidy was reduced by £2 in the £6 for 20 years given under the 1923 schemes and by £1 10s. a year in the £9 given for 40 years under the 1924 scheme. Taking the value of the reduction in each case it equals a capitalized value of £25 per house.

Since the war nearly £54,000,000 have been paid by the Government in subsidies for housing purposes, and for the year ending March 31, 1928, subsidies of £9,340,000 are provided for in the estimates of the Ministry of Health, the department under whose jurisdiction housing comes.

In addition to the Government subsidy the municipal authorities have contributed toward the cost of building, in some cases an amount equal to one-half that given by the Government.

Number of houses built.—In the five years before the war the average increase in the number of houses built in the United Kingdom was 61,000, while since 1919 the number completed during each year ending March 31, both with and without State assistance, have been as shown in the following table:

Year	With State assistance	Without State assistance	Total	Year	With State assistance	Without State assistance	Total
1920	715	[1] 53,800	251,988	1925	67,669	69,220	136,889
1921	28,549			1926	106,987	66,439	173,426
1922	101,071			1927	153,779	63,850	217,629
1923	67,853						
1924	18,664	67,546	86,210	Total	545,287	320,855	866,142

[1] Separate figures are not available for the years 1920–1923, and the number is based partly on an estimate. In September, 1927, it was officially stated that, although returns were not yet at hand, it could reasonably be assumed that 1,000.000 new houses had been built since the armistice.

Cost of subsidy houses.—The following table shows the average prices of houses included in contracts let by or in direct labor schemes of municipal authorities during three recent years:

Period	Nonparlor houses [1]	Parlor houses
1924–25, quarter ended—		
June, 1924	£413	£461
September, 1924	424	497
December, 1924	441	507
March, 1925	438	491
1925–26, quarter ended—		
June, 1925	439	491
September, 1925	443	504
December, 1925	444	497
March, 1926	442	492
1926–27, quarter ended—		
June, 1926	435	497
September, 1926	443	501
December, 1926	448	513
March, 1927	425	490

[1] A nonparlor type of house consists of dining room and 3 bedrooms, while a parlor type has a dining room parlor, and 3 bedrooms.

Since the announcement of the Government in March reducing the subsidy by an average of £25 a house on capitalized value as from October 1, 1927, there had been, according to the Minister of Health, a reduction of £36 in the cost of a parlor type and of £37 in the cost of a nonparlor type of house by October, 1927.

Other dwelling houses.—Apart from the houses built with State and municipal assistance, the principal call has been largely for better-class homes selling for about £1,500; but this demand has largely been met, and a cheaper house, selling for not exceeding £1,000, is required. The same kinds of lumber are used in these as in the subsidy houses, only of a better quality.

Materials used.—Lumber enters very little into the construction of dwelling houses in the United Kingdom, most of them being either brick, plain or stucco, or concrete. Some experiments have been made with wood and steel houses, but these are largely temporary expedients to meet the housing emergency.

Tile is the favorite roofing, having practically superseded slate, the use of it having been influenced to a large extent by the garden city movement.

Northern, eastern, and central European spruce and pine, and Canadian spruce, are all used in building construction, the quality depending upon the type of house to be built, the principal parts and sizes used being as follows:

Ground floor.—Joists, 2 by 4 inches; plates, 2 by 4 inches (in best construction plates are creosoted); flooring, 1 by 6.

First floor.—Joists, 2 by 7 inches and, to a lesser extent, 2 by 6 inches; plates, 3 by 4 inches; flooring, 1 by 6 inches and sometimes ⅞ by 6 inches.

Ceiling.—Joists, 2 by 4 and 5 inches; rafters, 2 by 4 inches; plates, 3 by 4 inches; ridge, 1¼ by 7 inches; hips, 1½ by 9 inches.

In order to take the tiles the rafters are covered either with ¾ or 1 by 4-inch featheredge boards. In the better class of house the slating and tile battens are laid on a ¾-inch boarded roof covered with felt, while in the cheaper ones the battens are laid directly on the bare rafters.

The walls are generally of plaster on sawn lath, the most popular size being 1 by ³⁄₁₆ inch, but the shortage of plasterers has caused a considerable increase in the use of wallboard during the past few years.

Most floors are of Swedish or Norwegian softwoods, 1 by 6 inches being most in demand for this purpose. Strange to say, square-edged lumber is largely used for flooring, only hardwood or flooring of southern pine and Douglas fir being tongue and groove.

The average subsidized house requires about 9 doors, 7 interior and 2 exterior. Douglas fir doors from the United States are most popular, followed, to a lesser extent, by pine from Sweden.

In addition to the ordinary brick, concrete, and stucco houses, some of wood and also of steel have been built under municipal housing schemes, the latter principally in Scotland. These, however, were largely approved by the authorities on account of the shortage of building labor, but by 1927 this shortage had been met, and it is very doubtful if, when the present contracts have been completed, orders for any more of these alternative methods of building will be approved.

BUILDING AND LOAN SOCIETIES

Since the war, owing to economic conditions, a greater proportion of the middle classes are owning their own homes and, as a result, the services of building and loan societies are being utilized to an increased extent. According to the latest report of the Registrar General, there were in 1927 a total of 1,066 building societies in Great Britain, having a membership of 1,257,000, mortgage assets of £171,220,815, and total assets of nearly £194,000,000. During the previous 12 months, the membership had increased by over 100,000, showing an increased understanding of the convenience of house purchasing through building societies.

FUTURE OUTLOOK

In spite of the large number of dwellings that have been erected, there is still a great shortage of those for the wage-earning class. According to those in close touch with the situation, it will take at least another five years before the shortage is made up. It is not considered, however, that the boom conditions that have existed during the past few years will continue, but a steady activity in house building may be reasonably anticipated.

HEAVY CONSTRUCTION

Offices, bank and apartment buildings, factories, warehouses, churches, and schools, are either of steel or of reinforced concrete faced with stone or brick. Very little wood is used in their construction apart from that required for temporary work, except for flooring, which has been covered in the section on "Planing-mill products."

For concrete forms, large quantities of softwood lumber, usually 1¼ or 1½ inches thick, are used, any inexpensive variety being used; and, while tight knots are not considered a defect, it is essential that the boards be square edged.

Temporary scaffolding, which is erected for every building, whether large or small, under construction in Great Britain, requires very large quantities of poles, putlogs, and scaffolding boards. To protect the public from the danger of falling material, temporary platforms are generally built over the sidewalk when a city building is being erected; these platforms are also used as a place to store material, such as brick and cement. Southern pine timber is always used for the supports of these platforms, its superior qualities making it preferred to any other wood for this purpose.

READY-CUT HOUSES

Since the armistice great efforts have been made by American, Swedish, and Norwegian manufacturers of ready-cut houses to place them on this market in view of the great housing shortage. While several municipalities approved their use in housing schemes and experimental houses were erected, they have not been entirely satisfactory and it is very doubtful if any additional ones will be built.

The only demand at present for ready-cut houses is for inexpensive seaside bungalows in out-of-the-way places and cricket and football pavilions, but the total business is exceedingly small as, for any building of a permanent character, brick is always preferred.

RAILROADS

Next to building and construction it is probable that the railroads annually consume more lumber than any other industry in the United Kingdom. Unfortunately there are no data available, so that it is impossible to give any figures as to the quantity used. There are about 20,000 miles of main-line railroad and, with the exception of a few hundred miles, it is grouped into four systems. All railroads are privately owned, there being none under Government control.

METHODS OF PURCHASE

All major purchases are made by the chief stores superintendent by tender, particulars of which are advertised in the public and trade press. Tenders must be made on the railroad company's printed form, which must not be altered. While not specifically mentioned in the tender, the ethics of the British lumber trade do not permit either foreign shippers or their agents to submit tenders, but they must pass through importers. American firms interested in this business, therefore, should bear this in mind and not attempt to approach the railroad companies direct but rather submit offers through their accredited agents.

The following are the general conditions applying to contractors for the supply of lumber issued by one of the leading British companies; and while each railroad uses its own form, the one shown may be taken as applying to all. It might be added that the results of these tenders are never made public, so that it is not possible to ascertain from official sources either the names of the successful bidders or price accepted.

CONTRACT FOR THE SUPPLY OF LUMBER

1. The contractor shall supply such of the timber comprised in contractor's tender as is included in the company's acceptance of the tender at the prices quoted by the contractor. Delivery to be effected at the contractor's risk and expense into trucks at the station named in the tender, consigned as directed but not before inspection. The company reserves the right of accepting any tender for a portion only of the quantities offered of any timber mentioned herein, and of making as many contracts as they think fit. The company does not bind itself to accept the lowest or any tender.

2. The contractor must state in the tender the time in which he undertakes to commence and complete delivery of the timber, and the timber must be delivered within the time stated.

3. The contractor shall notify in writing the company's divisional or district stores superintendents named on the order the place in Great Britian where and when the timber may be inspected before delivery, and shall there produce such timber for inspection. No timber to be loaded up or dispatched until it has been selected by the company's inspector, but such selection shall not be deemed an acceptance or affect the provision contained in condition 4 hereof. Timber must be delivered within seven days after selection by the inspector.

4. Any timber found, either on receipt or subsequently, to be inferior in quality, in any manner defective, or not in accordance with this contract, will be rejected, whether it be the whole or any portion of a delivery, and returned to the contractor at his own risk and expense; contractor (if required) to replace such rejections within a reasonable time.

5. Ends supplied with fair average specification parcels will be paid for at three-fourths the price quoted herein for full lengths.

6. If the contractor fails to supply any of the timber purchased, or shall omit to notify in writing the company's divisional or district stores superintendent that the timber required can be inspected, or fail to produce such timber for inspection, or shall fail to deliver in accordance with this contract within seven days after the selection of any timber, or shall supply any timber of an inferior quality, or in any manner defective or not in accordance with this contract, the company shall in any of the said cases have power to purchase from any other party and charge the contractor with the difference (if any) between the cost of the timber so purchased and the price under this contract and deduct the same from the moneys which may be due or subsequently become due to the contractor, or the amount of such difference may be recovered as a debt.

7. If the contractor shall commit any breach of this contract in any respect whatsoever, he shall compensate the company for all loss and damage which the company may sustain thereby, and the company shall have power (without prejudice to the company's rights and remedies in respect of such default) to terminate the contract at any time by notice in writing.

8. Separate invoices in duplicate to be sent to the divisional or district stores superintendent named on the order, simultaneously with the dispatch of the timber. The reference and number of the order to be quoted in each invoice.

9. A general statement of account to be sent the divisional or district stores superintendent named on the order within seven days after the end of each month, for all timber supplied in the preceding month, and in which all outstanding claims must be included, or they will not afterwards be admitted.

10. Payment by the company will be made at the end of the month following the month in which delivery is effected, if the timber is, in the opinion of the company's divisional or district stores superintendent, in accordance with the contract, subject to a reduction of $2\frac{1}{2}$ per cent discount, which contractor shall take off each invoice.

The railroad companies are exceedingly strict in their inspection methods, so much so that the supplying of their needs has become a special branch of the lumber trade catered to by a comparatively few large importers thoroughly conversant with their requirements. Further, a large proportion of the lumber purchased must be cut to special lengths and sizes, requiring sawmill facilities on the part of the successful bidder, as the cost of having this done at custom mills would be prohibitive.

PERMANENT WAY

Ties are naturally the largest wood item entering into the upkeep and renewal of permanent way, and these have been thoroughly covered under that heading.

Unlike in the United States, rails in Great Britain are not laid direct on the ties but rest in cast-iron blocks known as "chairs" which are in turn bolted to the ties. The rails are held in position by means of six-sided wedges or "keys," as they are called, made either of teak or native oak. When of teak they are imported in a finished state.

An illustration of a key is shown in the section on teak. Several sizes are used, $2\frac{1}{4}$ by $3\frac{7}{16}$ by 6 or 7 inches long being greatly in demand. As an illustration of the great number of keys used it may be added that one railroad alone estimated the requirements for 1928 at about 5,500,000.

While some railroads use galvanized-iron bolts to fasten the chair to the tie, others use wooden ferrules and treenails, the former being either of teak or native oak, while the latter are of oak only. Both ferrules and treenails are used in various sizes and must be manufactured according to templates and gauges approved by the railroad engineer.

ROLLING STOCK

According to the annual report furnished by the Minister of Transport, the number of passenger, restaurant, and sleeping cars (exclusive of those operated by electricity) on hand as of December 31, 1925, was 46,486, of Pullman cars 177, and in addition 21,608 cars of a miscellaneous character such as mail, baggage, or horse cars. The number of freight cars of all descriptions totaled 721,359, having a tonnage capacity, excluding brake cars, of 7,602,942 long tons (2,240 pounds). As the smaller freight cars wear out they are being replaced by ones having a capacity of 12 long tons or over, which is reflected in an increase in the average capacity per car as compared with the previous year from 10.58 tons to 10.75 tons. The total number of cars (other than special types) of 20 tons and over was 25,008 as compared with 22,790 in the preceeding year.

Besides their own, the railroads also hire some cars from private individuals and these numbered 2,284 on December 31, 1925. In addition to those either owned or hired by the railroad companies there were 11,010 privately owned cars registered during 1925 to run on the railroads of Great Britain. It is interesting to note that the average load per car for all descriptions of freight cars was 5.5 long tons during 1925. Only the privately owned freight cars are standardized and must be constructed according to the standard specifications of the railway clearing house. The majority of these consist of 12-ton cars for general freight and coke and 12 and 20 ton mineral cars largely used for the transportation of coal.

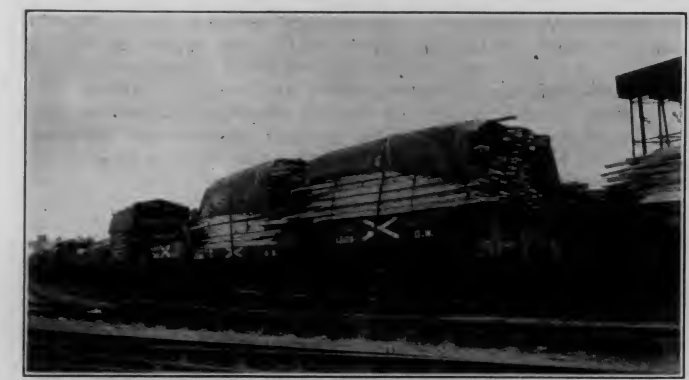


FIG. 25.—Shipping lumber by rail. Note protection from weather; box cars are not used for lumber in Great Britain

CAR BUILDING

Railroad equipment in Great Britain is manufactured and repaired both by the railroad companies themselves and in private car-building plants. Practically all the passenger cars and about one-half the freight cars used are built in railroad shops. The other half, consisting principally of mineral cars (coal, road material, asphalt, oil, etc.), is built by private companies. There is also an important export business in both passenger and freight cars, particularly to South America, South Africa, and other British Dominions. The principal car shops operated by the railroads themselves are located in Derby, Wolverton, Earlstown, Newton Heath, Stoke-on-Trent, York, Heaton, Darlington, Dukinfield, Stratford near London, Doncaster, Swindon, Eastleigh, Lancing, and Ashford. In addition to these there are a number of smaller plants located in different parts of the country.

The principal car-building plants privately owned are in Birmingham, Sheffield, Nottingham, Glasgow, Manchester, Lincoln, Cardiff, and Gloucester, many of them being quite extensive and employing a large number of hands.

The car-building plants of Great Britain are equipped with modern machinery and are an important part of the woodworking industry.

Besides their own, the railroads also hire some cars from private individuals and these numbered 2,284 on December 31, 1925. In addition to those either owned or hired by the railroad companies there were 11,010 privately owned cars registered during 1925 to run on the railroads of Great Britain. It is interesting to note that the average load per car for all descriptions of freight cars was 5.5 long tons during 1925. Only the privately owned freight cars are standardized and must be constructed according to the standard specifications of the railway clearing house. The majority of these consist of 12-ton cars for general freight and coke and 12 and 20 ton mineral cars largely used for the transportation of coal.

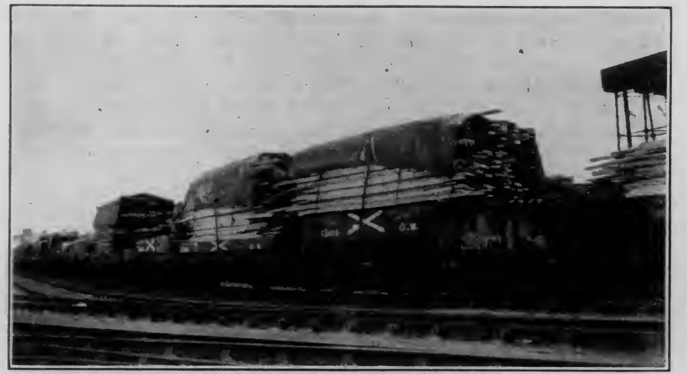


FIG. 25.—Shipping lumber by rail. Note protection from weather; box cars are not used for lumber in Great Britain

CAR BUILDING

Railroad equipment in Great Britain is manufactured and repaired both by the railroad companies themselves and in private car-building plants. Practically all the passenger cars and about one-half the freight cars used are built in railroad shops. The other half, consisting principally of mineral cars (coal, road material, asphalt, oil, etc.), is built by private companies. There is also an important export business in both passenger and freight cars, particularly to South America, South Africa, and other British Dominions. The principal car shops operated by the railroads themselves are located in Derby, Wolverton, Earlstown, Newton Heath, Stoke-on-Trent, York, Heaton, Darlington, Dukinfield, Stratford near London, Doncaster, Swindon, Eastleigh, Lancing, and Ashford. In addition to these there are a number of smaller plants located in different parts of the country.

The principal car-building plants privately owned are in Birmingham, Sheffield, Nottingham, Glasgow, Manchester, Lincoln, Cardiff, and Gloucester, many of them being quite extensive and employing a large number of hands.

The car-building plants of Great Britain are equipped with modern machinery and are an important part of the woodworking industry.

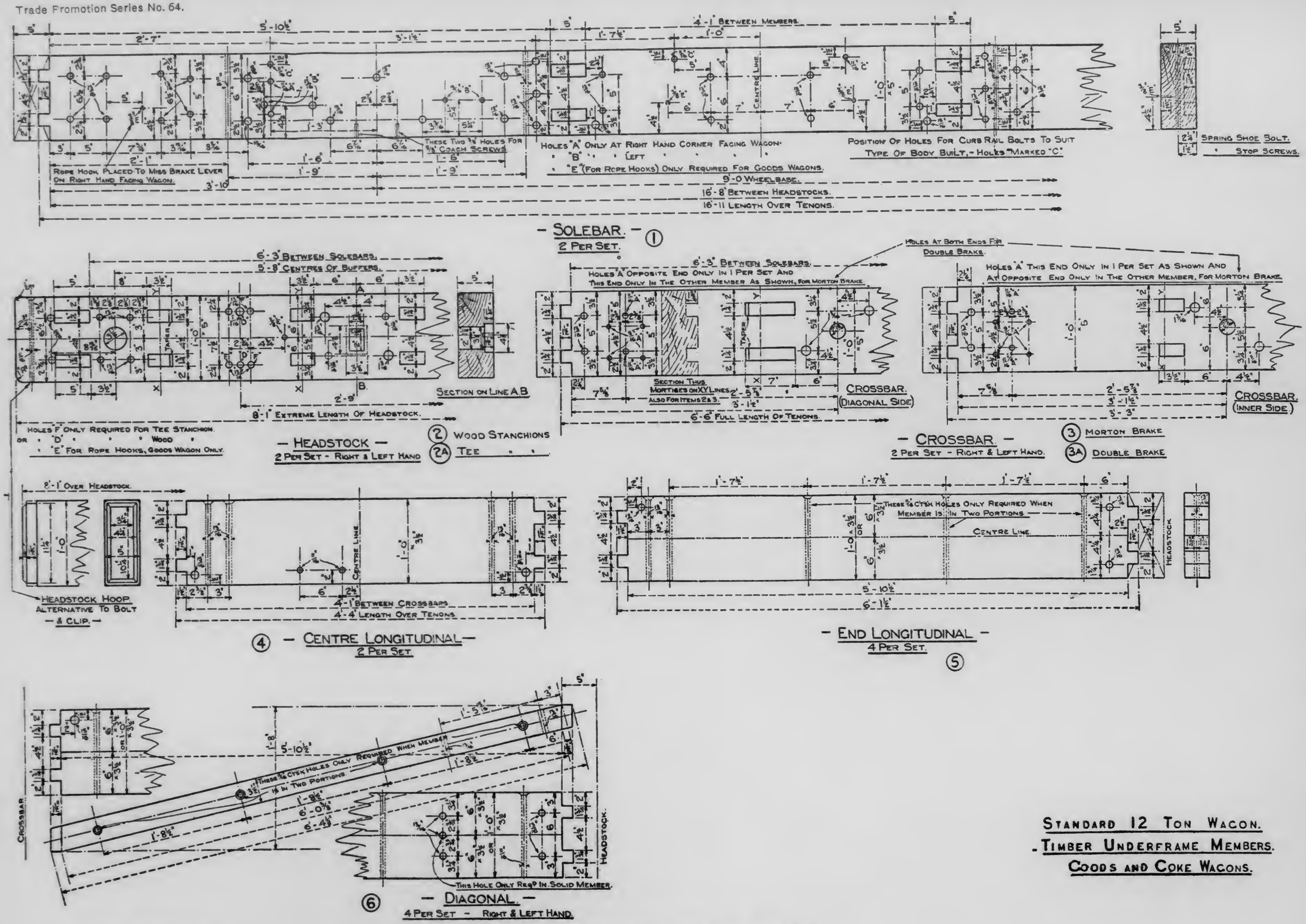

4'-1" Between Members
Position Of Holes For Curb Rail Bolts To Suit Type Of Body Built, - Holes Marked "C"
Holes "A" Only At Right Hand Corner Facing Wagon.
" "B" " " Left " " "
" "E" (For Rope Hooks) Only Required For Goods Wagons.
These Two 5/8" Holes For 5/8" Coach Screws
Rope Hook Placed To Miss Brake Lever On Right Hand Facing Wagon.
9'-0 Wheelbase.
16'-8 Between Headstocks.
16'-11 Length Over Tenons.
Centre Line
Spring Shoe Bolt.
" Stop Screws.
- Solebar. - ①
2 Per Set.
6'-3" Between Solebars.
5'-8" Centres Of Buffers.
Section On Line A B
8'-1" Extreme Length Of Headstock.
Holes "F" Only Required For Tee Stanchion.
or " "D" " " " Wood "
" "E" For Rope Hooks, Goods Wagon Only.
- Headstock -
2 Per Set - Right & Left Hand
② Wood Stanchions
②A Tee " "
Holes At Both Ends For Double Brake.
Holes "A" Opposite End Only In 1 Per Set And This End Only In The Other Member As Shown, For Morton Brake.
Holes "A" This End Only In 1 Per Set As Shown And At Opposite End Only In The Other Member, For Morton Brake.
Section Thus Mortises On XY Lines. Also For Items 2 & 3.
6'-6" Full Length Of Tenons.
Crossbar. (Diagonal Side)
Crossbar. (Inner Side)
- Crossbar -
2 Per Set - Right & Left Hand.
③ Morton Brake
③A Double Brake
8'-1" Over Headstock.
Headstock Hoop Alternative To Bolt & Clip.
4'-1" Between Crossbars
4'-4" Length Over Tenons
④ - Centre Longitudinal -
2 Per Set.
These 5/8" Ctsk Holes Only Required When Member Is In Two Portions
Centre Line
Headstock
5'-10½"
6'-1½"
- End Longitudinal -
4 Per Set.
⑤
Crossbar
These 5/8" Ctsk Holes Only Required When Member Is In Two Portions
This Hole Only Reqd In Solid Member.
Headstock
⑥ - Diagonal. -
4 Per Set - Right & Left Hand.
Standard 12 Ton Wagon.
- Timber Underframe Members.
Goods and Coke Wagons.

FIG. 26.—Under frame specification of standard British freight car

Passenger cars.—There are two different types of passenger cars in Great Britain, first and third class, the only difference being in the upholstery and amount of space allotted to each passenger, it being divided by arms in the first class and seating three persons to a side, whereas in the third class there are no divisions and each side of the carriage is expected to seat five persons. The reason there are only first and third class carriages is that while there formerly was a second class it was abolished some years ago. Most of the British passenger cars are divided into separate compartments except for journeys lasting several hours, when corridor cars are used. Most passenger cars are built with a steel underframe and a wood body, although one of the large railroad groups is now building a large number of all-steel cars for their express services, but generally speaking the wood body is practically universal in Great Britain.

Passenger-car siding is principally of teak, more of this species being used for car building than any other industry.

Teak, mahogany, and Polish and to a small extent American oak are chiefly used for interior panels and trim, while the floors, which are practically always covered with carpet or linoleum, and unexposed and painted parts are of north European pine. Australian karri and jarrah are also used for framework to some extent. The use of plywood for panelwork and partitions is growing, birch from Finland and Russia being chiefly used.

Freight cars.—Oak, karri, jarrah, and north European pine, or Baltic pine, as it is called by the railroad companies, are the chief woods used in the construction of freight cars in Great Britain. The underframe, which corresponds very much to the chassis of an automobile, may be made either of wood or steel but it is with the former that the United States lumber exporters are concerned, because upon the activity in the British car-building industry depends the demand for wagon oak planks. In addition to the American northern (Appalachian) white oak, the native and Polish varieties are also used, and, to a smaller but growing extent, Australian karri and jarrah and a little apitong from the Philippine Islands. English oak is preferred to any of these; but owing to there not being sufficient supplies and to the difficulty in getting the long lengths needed for sole bars, other sources of supply must be called upon.

Polish oak is well liked and but for the fact that it is not possible to get the stock greater quantities would be used. Exporters in Poland, however, are making great efforts to increase their supplies, and competition from that country is likely to increase in the future.

Next to the home grown, American northern white oak is preferred to any other species for underframe work, but it is now meeting with strong competition from Australian karri and jarrah, and it is probable that this competition will become even more severe in the future. Many car builders who heretofore used northern white oak planks exclusively are turning to other woods and a large portion of this business is now being placed in Australia.

SPECIFICATION AND QUALITY

The term "wagon scantlings" is used in the British car-building industry to describe the lumber used for underframing and contracts are frequently made for so many sets, each set representing the lumber bill for one car.

The following is the specification issued by one railroad, covering a set of wagon oak planks, together with grade required. Karri, jarrah, or English, Polish, or American oak are accepted but species must be stated on tender. Two pieces 5¼ by 12¼ inches by 17 feet 2 inches; 2 pieces 5¼ by 12¼ inches by 8 feet 3 inches; 2 pieces 5¼ by 12¼ inches by 6 feet 8 inches; 4 pieces 3¾ by 12¼ inches by 6 feet 8 inches; 4 pieces 3¾ by 12¼ inches by 6 feet 3 inches; 2 pieces 3¾ by 12¼ inches by 4 feet 6 inches; a total of 16 pieces.

Considerable quantities in the following sizes are also used by the same railroad: 4¾ by 11¼ inches by 16 feet 8 inches; 4¾ by 14¼ inches by 8 feet 2 inches; 5¼ by 12¼ inches by 8 feet 2 inches; 5¼ by 11¼ inches by 8 feet 2 inches; 5¼ by 11¼ inches by 7 feet.

It will be noted that the particular railroad in question requires the stock to be cut ¼ inch full, but this is not general among the others or the private car-building companies.

Grade.—To be of very best quality, sound throughout, free from sap, wane, cross grain, shakes, large and unsound knots, and other defects. To be straight die square, sawn accurately to the dimensions given, and subject to piece-by-piece inspection before delivery. All planks to be free from heart centers. There is, however, no uniformity of opinion in the British car-building industry, whether operated by the railroads or private companies, as to what constitutes prime quality wagon oak planks and, in the absence of any recognized grading rules, American exporters must necessarily depend upon their own judgment, with such assistance as is received from their agents, as to what is acceptable. However, the export of wagon oak from the United States is in the hands of comparatively few exporters, who have learned in the hard school of experience what to ship on their contracts. Even, however, with the utmost care the risk of a claim is always great owing to the decision as to whether or not the planks are up to grade being in the buyers' hands. As a consequence the strictness of inspection is, to a large extent, determined by the car builder's need and the condition of the market. When the demand is good and the stock is wanted there is little difficulty over shipments, but directly there is a slackening in demand or a weakening in prices, there is immediately a heavy increase in claims and rejections.

Standard coal car.—Large quantities of Northern wagon oak are used for the building of coal cars,the principal plants being centered in South Wales, the Midlands, Glasgow, and the northeast coast of England. A specimen set of planks used in the underframe of a standard 12-ton coal car, together with the grade as given by a leading British lumber agent, is as follows: 2 sole bars, 5 by 12 inches by 16 feet; 2 headstocks, 5 by 12 inches by 8 feet 1 inch; 2 cross bars or middle bearers, 5 by 12 inches by 6 feet 6 inches; 4 diagonals, 3½ by 12 inches by 5 feet 8 inches; 4 end longitudinals, 3½ by 12 inches by 5 feet 8 inches; 2 center longitudinals, 3½ by 12 inches by 4 feet 4 inches; 16 pieces in all.

End longitudinals may be built up of two pieces, each 3½ by 6 inches, bolted together by four ⅝-inch bolts. The length of the planks naturally varies according to the capacity of the car for which they are intended.

In addition to the underframe lumber, if a box car is to be built, two curb rails 4 by 5½ inches by 16 feet 6 inches are included in the

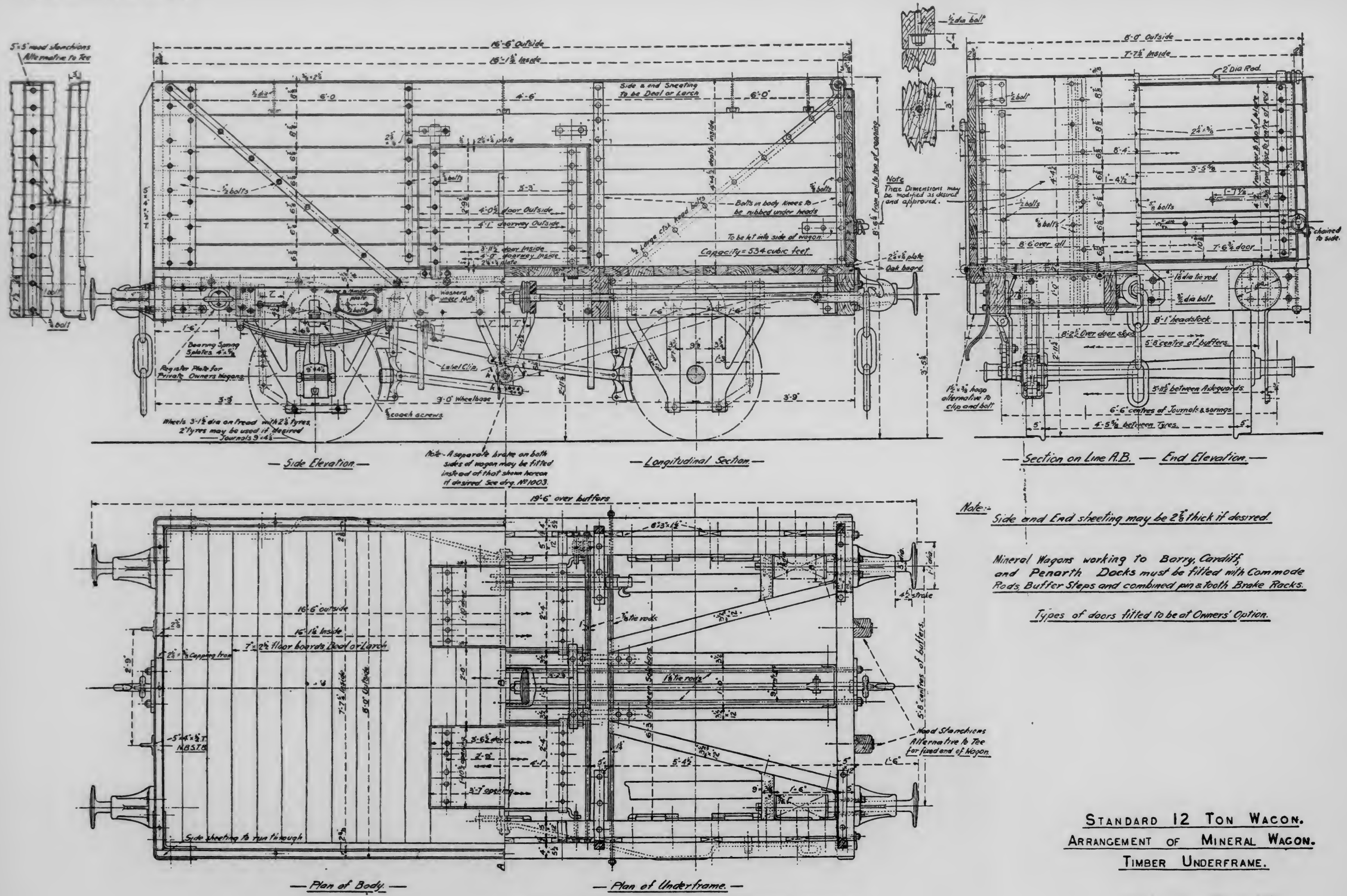

5×5 wood stanchions Alternative to Tee
16'-6" Outside
16'-1½" Inside
Side & end Sheeting to be Deal or Larch
Bolts in body knees to be nibbed under heads
To be let into side of wagon
Capacity = 534 cubic feet
2½×⅝ plate
Oak board
Bearing Spring Splates 4×⅝
Register Plate for Private Owners Wagons
Label Clip
9'-0" Wheelbase
Coach screws
Wheels 3'-1½" dia on tread with 2⅝ tyres. 2" tyres may be used if desired. Journals 9×4½
Note:- A separate brake on both sides of wagon may be fitted instead of that shown hereon if desired. See drg. No. 1003.
Note
These Dimensions may be modified as desired and approved.
— Side Elevation —
— Longitudinal Section —
8'-0" Outside
7'-7½" Inside
2" Dia Rod.
8'-6" over all
7'-6¾" door
Chained to side.
8'-1" headstock
5'-8" centres of buffers
5'-11½" between Axleguards
6'-6" centres of Journals & springs
4'-5⅜" between Tyres.
1⅝×⅜ hoop alternative to clip and bolt
— Section on Line A.B. — End Elevation. —
19'-6" over buffers
16'-6" outside
16'-1½" inside
7"×2⅝" floor boards Deal or Larch
Capping Iron
7'-7½" inside
8'-0" outside
Side sheeting to run through
5'-8" centres of buffers
Wood Stanchions Alternative to Tee for fixed end of Wagon
— Plan of Body. —
— Plan of Underframe. —
Note:- Side and End sheeting may be 2⅝ thick if desired.
Mineral Wagons working to Barry, Cardiff, and Penarth Docks must be fitted with Commode Rods, Buffer Steps and combined pin & tooth Brake Racks.
Types of doors fitted to be at Owners' Option.
STANDARD 12 TON WAGON.
ARRANGEMENT OF MINERAL WAGON.
TIMBER UNDERFRAME.

FIG. 27.—Superstructure specification of standard British mineral car

set. Curb rail is the technical name used for the main member on which the body and frame of a box car are built.

Grade.—To be fresh sawn, sound, square edges, and cut full to size; free from large, loose, or dead knots, grub or rafting pinholes, excessive sap, wane, or decay. The 5 by 12-inch will admit well-boxed heart centers, all other sizes to be entirely free of heart centers. In Scotland, however, where wagon oak planks are sold under the designation of "railway oak planks," heart centers are not admitted in any size and some English railroads also include the same stipulation in their contracts.

Large open checks are strongly objected to everywhere, but these can be avoided by cutting stocks during the late fall and winter months, so that they dry out before the hot weather has had a chance of opening up the face of the planks.

Principal ports of entry.—The Bristol Channel, Cardiff, Glasgow, Hull, Liverpool, and Newcastle-on-Tyne are the principal ports of entry for wagon planks, which are distributed from them to the car plants in the adjacent territory.

Underframe parts.—For the information of those not familiar with the technical names, sole bar, headstocks, longitudinals, etc., used in connection with lumber entering into the underframe of railroad cars, the following brief explanation is given:

Sole bars.—The two longer sides of the underframe.

Headstocks.—The two shorter ends which carry the buffers.

Crossbars.—Two pieces stretching from sole bar to sole bar, to tie the frame together and take up the stresses.

Longitudinals.—Parallel beams stretching from headstock to headstock in the center of the car.

Diagonals.—Pieces stretching from each corner just behind the buffer to the junction of the crossbar and longitudinal.

Sides, ends, tops, and bottoms.—With the exception of the framing, which is of oak, north European pine is used almost exclusively for the superstructure of freight cars, although alternative bids for Douglas fir are occasionally asked for by the railroad companies on account of official pressure being brought to bear upon them to use Empire timber to a greater extent. Little, however, has been used either by the railroad companies themselves or private car builders so far, and it is very doubtful if it will ever replace the north European pine to any appreciable extent. While larch is permitted according to the railway clearing house standard specification, practically none of it (which in pre-war days was received in fair quantities from the White Sea) is now used, and the reference to it in the specification is probably a carry-over from before the war.

Lumber for car building is purchased cut as near as possible to lengths required by the particular size and type of car under construction, those most in demand being 2½ and 3 by 7, 8, and 9 inches, with a few 11 inches, all 14 to 17 feet long. One reason for these lengths being used to such a great extent is that they can be cut, with very little waste, into three pieces for cars having side doors.

For the floors of freight cars, which naturally are subjected to considerable wear and tear, a harder variety of wood is preferred, and knots are not so serious a defect as when the lumber is to be used for sides and ends. For this reason most of the lumber for flooring is of pine from the Baltic States, the principal source being Latvia. The Latvian lumber industry has for many years specialized in the manufacture of flooring for British railroad cars and now enjoys a virtual monopoly of this business. Lumber used for this purpose is known as "wagon bottoms" and may be either of pine or spruce, no distinction being made between them. The quality known as "unsorted" is used in dimensions of 2½ by 7 inches, 7 or 7½ feet long.

BUILDINGS AND MISCELLANEOUS SUPERSTRUCTURES

Large quantities of lumber are annually required for the maintenance and renewal of stations (waiting, booking, and refreshment rooms), signal posts and boxes, bridges, and fencing. Where strength is not required north European pine is used, chiefly Russian and Swedish in various qualities, depending upon the purposes for which it is to be used.

For repair of bridges or other construction work where strength is required southern pine timber is used. The grade under which one prominent railroad purchases its supplies of this is as follows: "To be well sawn, sound, straight, and free from knots, shakes, and heart shakes as selected by their inspector."

Where the dimensions are exceptionally large, Douglas fir is used in place of southern pine, the grade which the same railroad uses in its tender being as follows: "To be of good sound merchantable quality, reasonably free from large, loose, or unsound knots; free from shakes or heart shakes as selected by their inspector."

For signal posts hewn southern pine is preferred but complaints are made that is it becoming increasingly difficult to get timber of the size and quality required.

Telegraph poles.—British railroads operate their own telegraph systems and purchase a certain number of new poles each year to replace those that are worn out. The quantity is small, however, and of little importance to the lumber trade. The specifications and grading rules, as applying to poles purchased by the Post Office Stores Department, are followed with very slight deviations.

Pattern making.—Canadian white pine purchased either as lumber or "wany pine logs" and cut into the required dimensions in their own shops enjoys a virtual monopoly of the railroad business. In addition, some very small quantities of Siberian, western white, and California sugar pine are used, but the railroad engineers are extremely conservative and it is difficult to introduce any other species than those to which they are accustomed, and price is not so important a matter as with private engineering companies.

Delivery wagons, hand trucks, etc.—The collection and delivery of freight, also of passenger baggage, is an important part of a British railroad's business. Transfer companies, common in the United States, are unknown, their work being done by the railroads themselves under what is known as the "luggage in advance" principle. Some of them also operate motor coach services, although these are only slightly developed as yet. Large numbers of hand trucks are also used for the handling of freight and passenger baggage at the stations. Most of these vehicles are made by the railroad companies in their own shops or, if motor vehicles, then the bodies are built by them. Ash (principally English) is used for shafts and framework; hickory, oak, and elm for the wheels, and north European pine for the sides and driver's cabs, considerable quantities being used for these purposes during the course of a year.

MISCELLANEOUS ITEMS

Hammer shafts, etc.—Large quantities of shafts for hammers, axes, shovels, and picks are used by railroads and are required to be turned from either tough young English ash or American hickory of the best quality. They must be straight and close-grained, free from knots and other defects, and in accordance with standard patterns.

The following are the descriptions and sizes generally called for:

- Ax, 26 inches.
- Adze, 34 inches.
- Hammer—
    - Hand, finished, 16 and 18 inches.
    - Slogging, finished, 22 and 24 inches.
    - Blacksmith's, 26 inches.
    - Strikers and quarter, 30 inches.
    - Platelayer keying, 36 inches.
    - Strikers, 39 inches.
    - Tapping, 36 inches.
- Pick and beater, 38 inches.
- Mall, 42 inches.
- Coal pick, hickory.
- Firing shovel shafts, English ash or American hickory:
    - Long—28 by $1\frac{9}{16}$ inches in diameter to pattern.
    - Short—21 by $1\frac{9}{16}$ inches in diameter to pattern.

Some railroads prefer to make their own shafts and for this purpose purchase American hickory logs. It is said, however, that their demands, as far as percentage of whitewood is concerned, are such as to make the business unattractive.

Shunting poles.—Shunting poles are required to be made from well-seasoned good white hickory, straight grained, free from discolored sap, knots, and other defects. A proportion (not exceeding 25 per cent) of poles containing some red heart are accepted provided they comply with the specification and are of equal quality to the white in every other respect. The poles are 66 inches in length and must be turned smooth to a diameter of 1⅝ inches and tapered 7 inches at one end, to ¼-inch diameter, so as to fit the shunting hook. Each pole is tested at both ends in the following manner: With a fulcrum of 2 feet 6 inches the pole must lift a weight (placed 4 inches from end) of 196 pounds. After the test the pole must remain straight, i. e., without permanent bend.

Ladders.—Strong sides are required to be formed of the best Oslo pine or spruce poles with straight and long grain, free from knots and other defects; the rungs to be of good quality oak and cleft, not sawn; the ends to be put in with white lead and to be spaced at 9-inch centers. The ladder must not be painted. The bolts $\frac{5}{16}$-inch diameter to be fixed underside of second rung at bottom, also one at second rung from top with galvanized washers and burred over, and additional tie bolt to be fixed at every tenth rung. Additional tie bolts as follows to be evenly divided over ladder:

12 to 20 feet, 1 additional tie bolt.
Over 20 to 30 feet, 2 additional tie bolts.
Over 30 to 40 feet, 3 additional tie bolts.
Over 40 to 45 feet, 4 additional tie bolts.
Over 45 to 50 feet, 4 additional tie bolts.

In addition to a small number of grain ladders generally made of southern pine, folding stepladders of north European spruce 6, 7, and 8 feet long are also used in large quantities.

Other miscellaneous wood items include hickory brake sticks and telegraph arms, barrows, hayrakes, flag staves, and handles for brooms, carriage washing brushes, and mops.

FURNITURE

The manufacture of furniture and cabinet ware is one of the principal British industries and the most important outlet for American hardwoods. With the exception of nursery furniture, cheap bedroom suites, and pieces used in the kitchen there is little call for softwood furniture, the public demand being exclusively for that made of hardwood.

While there are a few large factories operating on a mass-production scale, the bulk of the furniture is produced in small factories, employing a comparatively small number of hands. In London many of these are nothing more than converted retail shops, which specialize in one or two types of furniture, such as buffets, dining tables, china and other cabinets, writing desks, bookcases, etc. Hand labor is largely used in the smaller factories and, for that reason, the milder textured northern American and central European oak is preferred. The use of machinery, however, is increasing and with its larger use the question of price rather than texture is becoming the deciding factor in lumber purchases. This does not apply to the wood used in the higher grades of oak furniture, where the central European stock still predominates.

FASHIONS AND TENDENCIES

The British taste in furniture to-day is essentially for plain styles and, as a result, manufacturers are utilizing to an increasing extent the natural beauties of figure and grain of the various woods rather than depending upon elaboration of design for its appeal to prospective buyers. While modern adaptations of Chippendale, Sheraton, Heppelwhite, and Queen Anne designs are still popular in the more expensive furniture, the tendency is toward a more varied type and consequently sales of "suites" are diminishing, individual pieces being more frequently purchased instead. The heavy "solid" furniture with horsehair upholstery of Victorian days has completely disappeared from the retail store; light, easily movable pieces, attractive in shape and design, have taken its place. The modern house has small rooms and the older ones are being converted into apartments and, as a result, there is no demand for large pieces of furniture. The advancement of hygienic ideas and the problem of domestic help are also influencing the demand for plain styles of furniture, many persons now demanding pieces with a flush finish that will not harbor dust. This is very noticeable in wardrobes, many to-day being made without any cornice whatever.

It is in bedroom suites that perhaps the most notable changes have taken place, the tendency running strongly toward brighter and more attractive pieces. It is the growth of this demand that has largely caused the present popularity of walnut, because of its beauty or variety of figure.

PRINCIPAL MANUFACTURING CENTERS

While London, Manchester, Nottingham, Birmingham, and the Bath and Bristol districts of England, and Glasgow in Scotland, are the principal manufacturing centers in the British Isles, there are thousands of small factories scattered all over the country, the industry being by no means centralized in a few cities to the extent that it is in the United States.

The chair industry, however, is to some extent an exception, the town of High Wycombe, in Buckinghamshire, about 26 miles from London, being the principal manufacturing center, although many chairs are made in other cities where the furniture industry is prominent.

The chair-making industry in High Wycombe was originally brought about by ample supplies of beech and birch timber in the neighborhood and from early times it has been the chief chair-making center of the country.

DINING-ROOM FURNITURE

The furniture for an average British dining room to-day consists of a sideboard or buffet, 4 feet 6 inches wide, usually having two drawers and two cupboards, each with a shelf; a table (which may be one of a variety of shapes, depending upon the style of the set), which generally extends on the draw-leaf principle from 3 feet to 5 feet, although greater lengths can be obtained if required; and a set of five chairs, including one with arms, called a "carving" chair. The suite may be either purchased complete or each piece individually, according to the wishes of the purchaser.

Many dining rooms also contain other pieces in addition to those mentioned, such as a bookcase, writing desk, side table, tea wagon mounted on rubber-tired wheels, carving table, easy chairs, etc., made in the same style as the principal furniture.

Mahogany, walnut, and oak are practically the only woods used, except for cabinets or other decorative pieces of furniture, which are frequently made of the fancy hardwoods or inlaid with marquetry.

Mahogany.—Mahogany is the favorite wood for the more expensive dining-room furniture, but its high cost limits the market for it. Where, however, price is a secondary factor, mahogany easily retains first place in the popular favor, but walnut is pushing it hard to-day. Adaptations of the styles made famous by the great furniture makers of the past, such as Chippendale, Sheraton, and Heppelwhite, modified to meet modern housing facilities, are particularly in demand. In such designs the beautiful figure and high polish obtainable in Central American mahogany make a particularly fine effect of charm and refinement.

The panelwork of these designs is always of finely figured wood, usually of veneer, applied in the case of the best grade of furniture on a core of the same wood, or, in the less expensive grades, on a core of okoumé plywood and to a small extent yellow poplar.

Walnut.—Since the war there has been a decided revival in the vogue for walnut furniture in Great Britain and it is being used to an increasing extent for high-grade work.

It is, however, in styles of the Queen Anne period, when walnut gained such prominence as a furniture wood, that it is chiefly used to-day, also for special pieces, such as bookcases, tables, china cabinets, bureaus, and writing tables, also chairs with their characteristic rounded backs, unpierced vase-shaped splat, and cabriole legs.

The French and English varieties are chiefly used, many beautiful panel effects being secured by utilizing burls and the various kinds of figures obtained by different veneering methods and especially by taking two adjacent pieces out of the same log and turning one over. The figure in both pieces is the same and matches when placed side by side; the pattern so obtained is called "matched figure."

Oak.—While mahogany, and to a certain extent walnut, are the principal woods used for the manufacture of the more expensive dining-room furniture, oak is an easy first when it comes to filling the needs of the great masses of the British public.

For the best grades of oak furniture the varieties mostly in demand are the Slavonian, or Austrian, as it is called in the trade, imported from central Europe and the Volhynian, from the Province of that name, which lies partly in Poland and partly in Russia. Their mild texture, evenness of color, and fine figure make these varieties particularly well adapted for furniture making. A large portion of these imports are in the form of billets and logs cut through and through, which enables the furniture manufacturers, who attach great importance to this in high-grade furniture, to match the panels of the various pieces and also to secure wider widths than is possible in edged lumber.

Japanese oak is also favored by the furniture industry but the quantity available is comparatively small.

However, only a small part of the total production of oak furniture in Great Britain is made from stock supplied by the above-named countries, by far the greater part of the industry's needs being filled by white oak, either plain or quarter-sawn, supplied by the United States, on which the British furniture manufacturers depend for the greater part of their oak requirements.

The Jacobean or "mission," as it is called in the United States, style is most favored for oak furniture, the dark finish being greatly admired, and by far the greater part of the oak furniture sold is of this design and finish. The idea of making inlaid panels, popular during the William and Mary period, is also being applied to oak by some manufacturers with good effect. Another finish that has come to the forefront during the past few years is the "weathered" oak shade, while still another style is fitted with antique iron hinges and handles and leather backs to the chairs to give an old-time effect.

BEDROOM FURNITURE

Many changes have taken place in the furniture for the bedroom during the past few years, the most noticeable being the passing of the washstand with its marble slab top, basins, and water pitchers, long a familiar sight in British bedrooms, now replaced, at least in

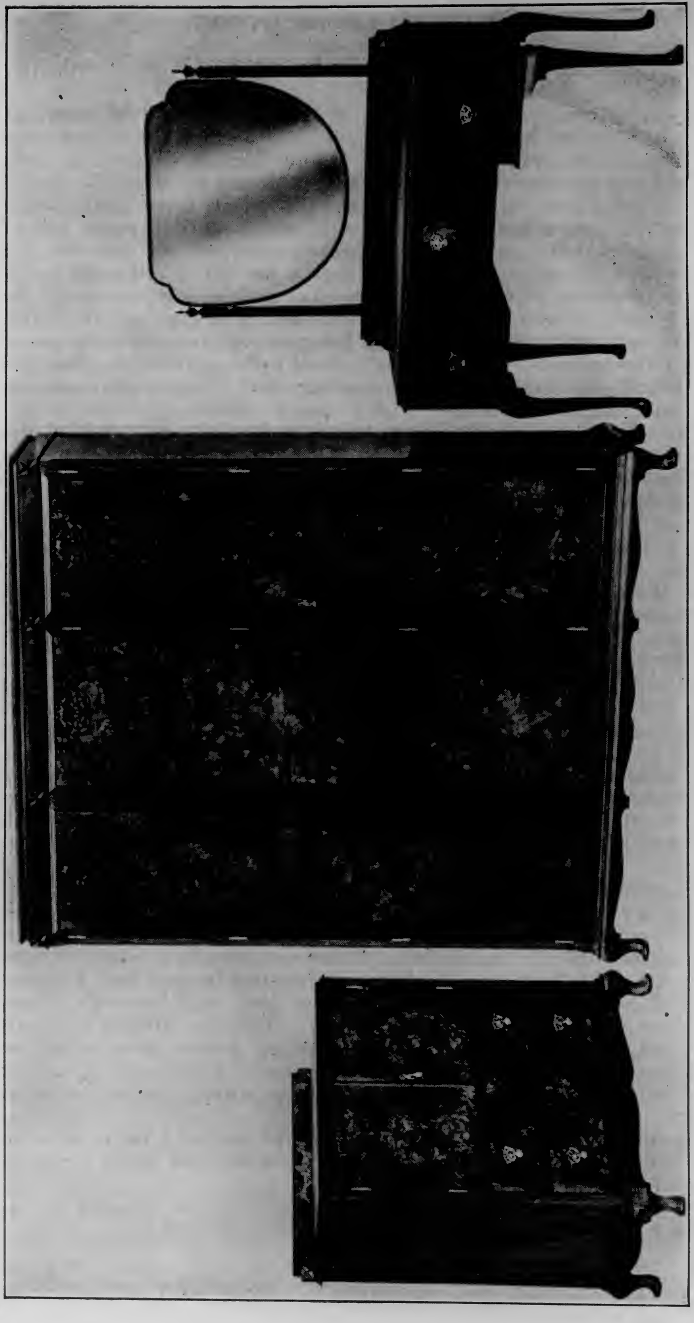


FIG. 28.—Bedroom suite of American walnut

on a core of the same wood, or, in the less expensive grades, on a core of okoumé plywood and to a small extent yellow poplar.

Walnut.—Since the war there has been a decided revival in the vogue for walnut furniture in Great Britain and it is being used to an increasing extent for high-grade work.

It is, however, in styles of the Queen Anne period, when walnut gained such prominence as a furniture wood, that it is chiefly used to-day, also for special pieces, such as bookcases, tables, china cabinets, bureaus, and writing tables, also chairs with their characteristic rounded backs, unpierced vase-shaped splat, and cabriole legs.

The French and English varieties are chiefly used, many beautiful panel effects being secured by utilizing burls and the various kinds of figures obtained by different veneering methods and especially by taking two adjacent pieces out of the same log and turning one over. The figure in both pieces is the same and matches when placed side by side; the pattern so obtained is called "matched figure."

Oak.—While mahogany, and to a certain extent walnut, are the principal woods used for the manufacture of the more expensive dining-room furniture, oak is an easy first when it comes to filling the needs of the great masses of the British public.

For the best grades of oak furniture the varieties mostly in demand are the Slavonian, or Austrian, as it is called in the trade, imported from central Europe and the Volhynian, from the Province of that name, which lies partly in Poland and partly in Russia. Their mild texture, evenness of color, and fine figure make these varieties particularly well adapted for furniture making. A large portion of these imports are in the form of billets and logs cut through and through, which enables the furniture manufacturers, who attach great importance to this in high-grade furniture, to match the panels of the various pieces and also to secure wider widths than is possible in edged lumber.

Japanese oak is also favored by the furniture industry but the quantity available is comparatively small.

However, only a small part of the total production of oak furniture in Great Britain is made from stock supplied by the above-named countries, by far the greater part of the industry's needs being filled by white oak, either plain or quarter-sawn, supplied by the United States, on which the British furniture manufacturers depend for the greater part of their oak requirements.

The Jacobean or "mission," as it is called in the United States, style is most favored for oak furniture, the dark finish being greatly admired, and by far the greater part of the oak furniture sold is of this design and finish. The idea of making inlaid panels, popular during the William and Mary period, is also being applied to oak by some manufacturers with good effect. Another finish that has come to the forefront during the past few years is the "weathered" oak shade, while still another style is fitted with antique iron hinges and handles and leather backs to the chairs to give an old-time effect.

BEDROOM FURNITURE

Many changes have taken place in the furniture for the bedroom during the past few years, the most noticeable being the passing of the washstand with its marble slab top, basins, and water pitchers, long a familiar sight in British bedrooms, now replaced, at least in

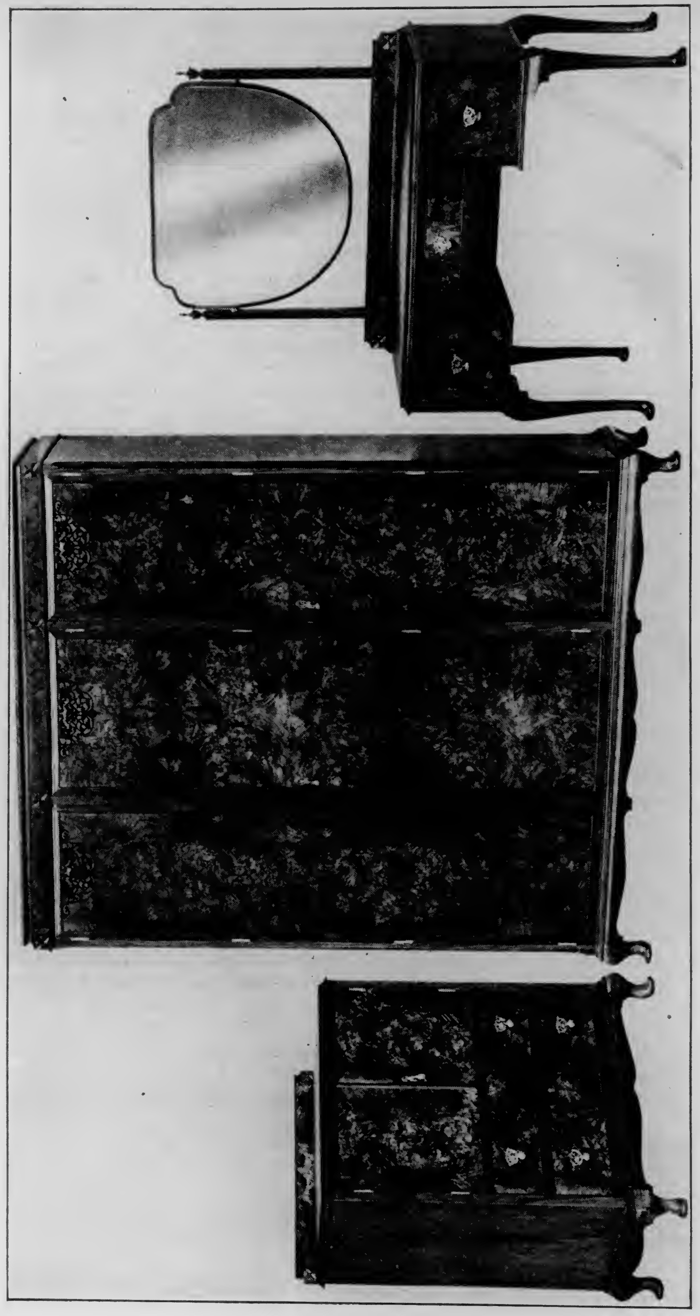


FIG. 28.—Bedroom suite of American walnut

many of the newer homes, by stationary washstands fitted with running water.

As in the dining room, oak is the principal wood used for the great bulk of bedroom furniture, while mahogany and walnut are reserved for the higher grades. However, walnut furniture is much more extensively used in the bedroom than in dining-room suites, and is now making a strong bid for first place in public favor in high-class suites, full advantage being taken of the beautiful panel effects obtainable by the use of matched figure veneer.

Occasionally suites are made of gray wood (dyed sycamore) with inlays of ebony, mother-of-pearl, ivorine, and colored woods; zebra-wood, padouk, and other fancy hardwoods or lacquer, which is also coming to the forefront again after being out of favor for some years.

An average suite.—An average suite of bedroom furniture consists of a wardrobe, dressing table or dressing chest, chest of drawers, and one or two chairs, generally with a cane or rush seat.

Wardrobes are usually divided into two parts, one-third of the interior being fitted with shelves, the remainder with hanging accommodations. Sometimes they are fitted with one long or two short drawers beneath. The sizes of wardrobes vary from 4 to 6 feet in width and have from one to three doors. Generally in the larger sizes the center door either on the inside or outside is fitted with a full-length mirror. For small single bedroom suites the wardrobe is either 2 or 3 feet wide, without shelves, but fitted with hanging hooks, either with or without a mirror on the outside of the door. On account of changed housing conditions, however, about four to six single suites are sold to every double one.

Dressing tables, or dressing chests, vary in design according to the style reproduced and are 3 feet 3 inches, 3 feet 6 inches, 3 feet 9 inches, 4 feet, and 4 feet 6 inches wide, 3 feet 6 inches being the most popular.

Chests of drawers, used for storing clothes, have a varying number of drawers from two short at the top and one long underneath, to two short and three long, while in some cases all the drawers run the full width of the piece, which runs from 2 feet 9 inches to 3 feet 6 inches.

Additional pieces, such as toilet chest or cupboard, or tallboy chest, are sometimes included in a bedroom suite.

The chifforobe, or "fitted wardrobe," as it is called, is rapidly coming to the front in Great Britain. These are made in a variety of sizes and fitted for both men and women, ranging from 4 feet 4 inches high, 3 feet 9 inches wide, and 19 inches deep, to 6 feet high, 4 feet 3 inches wide, and 1 foot 8 inches deep. They are divided into two sections, one side being fitted with shelves, pigeon holes, trays, or drawers in various sizes; the other is provided with an extending rod to accommodate six suits or dresses, with a place for shoes below.

Bedsteads.—Bedsteads are not considered part of a bedroom suite but must be purchased separately and when of wood are of the same species as the rest of the furniture.

Although metal bedsteads are still called for, the demand has to a very large extent gone over to those made of wood.

The size of bedsteads is practically standardized to 2 feet 6 inches or 3 feet and 3 feet 6 inches for single; and 4 feet and 4 feet 6 inches for double, all 6 feet 6 inches long.

INEXPENSIVE FURNITURE

As in the better grades of furniture, oak is the most popular wood for the inexpensive kind such as is used in the homes of the wage-earning classes, cheap hotels, boarding houses, and bedrooms occupied by domestic servants, more being made of this than all the others combined. Besides oak, various woods, such as American red gum (satin walnut), also European beech and Canadian birch stained with a mahogany or walnut finish, are used, while the cheapest kind of bedroom furniture is of north European pine painted in imitation of oak or some other variety. In the manufacture of imitation mahogany furniture, in order to simulate the Sheraton style, marquetry transfers are used to a large extent, which give an inlay effect of such excellence that it is difficult for the ordinary individual to tell them from genuine inlay work. In addition, there is a considerable demand for softwood nursery furniture enameled white or in pastel shades, many of these suites being decorated by means of transfers with pictures illustrating various nursery rhymes.

The use of American red gum in the British furniture industry, however, is largely regulated by its price in relation to other woods, and as soon as the economic level is reached the demand falls off and other woods are used instead. While the average purchaser will buy "satin walnut" furniture when it is cheaper than oak, he prefers the latter wood and will always take it unless there is a money advantage. For this reason the enhanced value of gum during the past few years has had the effect of transferring the public demand largely to oak, and to-day comparatively little is used by this industry as compared with pre-war years.

It is in this furniture that American sap gum enters principally for backing purposes while for drawer sides and backs mild textured ash or tupelo is used.

UPHOLSTERED FURNITURE

Upholstered or overstuffed armchairs and settees are very popular and are usually found in the library or dining room. Leather, velour, cretonne, damask, or other fabric is used as a covering material to meet the purchaser's wishes, while the frames are of Canadian birch or continental beech, chiefly the former.

ANTIQUE FURNITURE

A thriving business is done in the reproduction of antique furniture of all styles and periods. The principal items are Jacobean buffets, tables, chests, and armchairs of native oak, and Queen Anne style dressing tables, bureaus, and bookcases of walnut.

KITCHEN FURNITURE

Furniture for the kitchen, such as dressers and tables, is usually made in millwork factories out of north European pine and painted. In the event the top is to be left in a natural state for the convenience of washing, spruce, on account of its white color, is used.

While some architects and builders are now including built-in kitchen cabinets in their plans for new dwellings, they are not sufficient to affect the demand for the manufactured article. Only since the war has the American style of fitted kitchen cabinet been known, but since that time it has rapidly come to the forefront as a labor saver. These cabinets are obtainable in light or dark finishes or white enameled with rustless hinges and door fastenings to meet the variable temperatures of the kitchen. While some of these cabinets are imported, most of them are now manufactured in Great Britain and are sold by both furniture and hardware dealers.

OFFICE FURNITURE

There are many substantial firms in Great Britain which specialize in the manufacture of office furniture, such as chairs, desks, and filing cabinets, most of it being modeled on American lines. American white oak is chiefly used while the more expensive kind, such as is used in banks, is of mahogany or walnut. The average British firm, however, does not pay as much attention to the furnishing of its office as is done in the United States, many not having been refurnished since the business was started, which may be from 50 to 100 years. As a result, there is a tremendous amount of antiquated office furniture in use which is replaced only when the firm moves into new quarters. There is, however, a great activity in the erection of new office buildings in London and also in the provincial cities so that the outlook for increasing sales of furniture is bright. But it is doubtful if there is much opportunity for American manufactured goods, exports of which to the United Kingdom, according to official statistics, were valued at only $33,399 (consisting of about one-third chairs and two-thirds furniture) during 1926, indicating that it can not compete in price with the domestic-made product.

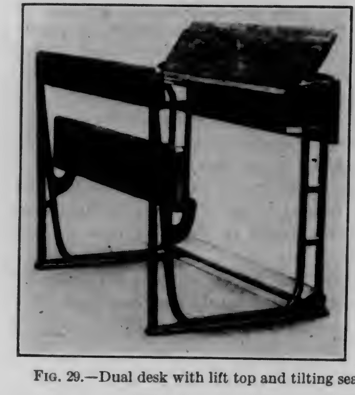


FIG. 29.—Dual desk with lift top and tilting seat

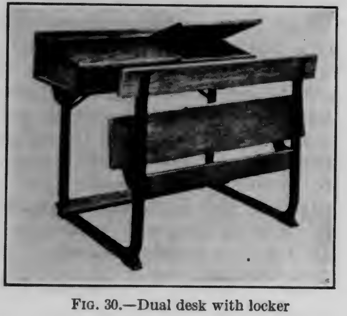


FIG. 30.—Dual desk with locker

SCHOOL FURNITURE

The manufacture of school furniture in Great Britain is a specialized branch of the industry and there are not more than a dozen firms of note in the entire country that make it.

Most desks are made according to designs patented by the manufacturers, the patented idea, however, applying more to the design of the metal and the method by which the woodwork is fitted to the metal supporting standards than to the design of the desk itself. The sizes of school desks are standardized with the heights carefully graded, the comparative height of desk and seat being proportionate to meet the different standards, the distance from floor to seat being about 62 per cent of the total height.

The "dual" desk is used in all British elementary schools and is 3 feet 4 inches long with a height from the floor to the lowest edge of the writing slope varying from 25 to 32 inches, and height of seat varying from 15⅜ to 19⅛ inches, with a 13 to 14 inch desk slope. One of the most popular "dual" desks has a writing slope which may be lifted, the underside of which is provided with a suitable ledge for a book shelf, a tilting seat, strengthening stretcher rail below, and foot rail. Another type of "dual" desk is divided into two compartments each with separate lids. Both these types of desks are made either with or without a fixed inkwell rail and fitted with both steel and cast-iron standards.

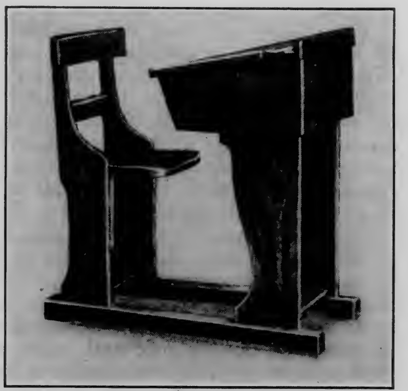


FIG. 31.—Single desk with locker

Single desks are nearly always fitted with lockers and are usually made entirely of wood, 22 or 24 inches in length, 18 inches in width and heights to lowest edge of writing slope of 26, 28, 30, 31, 32, and 33 inches. Unlike the "dual" desk, it is not fitted with a seat but a separate chair must be used. These, however, are not made by the desk manufacturers but are purchased by them ready-made.

Desks are seldom found in the infants' department of elementary schools, kindergarten tables 18 to 21 inches in height being employed instead.

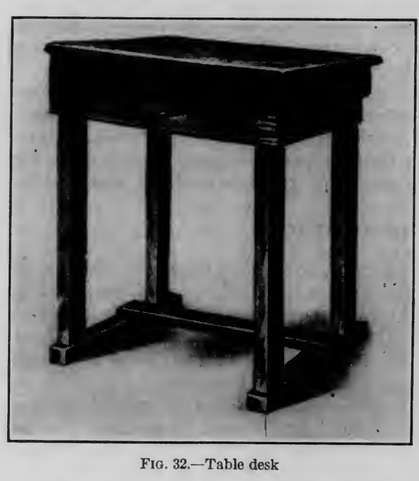


FIG. 32.—Table desk

In addition to desks, manufacturers of school furniture also make cupboards, teachers' desks, blackboards, easels, model stands, and writing slopes. Oak and southern pine are used for the better type

While some architects and builders are now including built-in kitchen cabinets in their plans for new dwellings, they are not sufficient to affect the demand for the manufactured article. Only since the war has the American style of fitted kitchen cabinet been known, but since that time it has rapidly come to the forefront as a labor saver. These cabinets are obtainable in light or dark finishes or white enameled with rustless hinges and door fastenings to meet the variable temperatures of the kitchen. While some of these cabinets are imported, most of them are now manufactured in Great Britain and are sold by both furniture and hardware dealers.

OFFICE FURNITURE

There are many substantial firms in Great Britain which specialize in the manufacture of office furniture, such as chairs, desks, and filing cabinets, most of it being modeled on American lines. American white oak is chiefly used while the more expensive kind, such as is used in banks, is of mahogany or walnut. The average British firm, however, does not pay as much attention to the furnishing of its office as is done in the United States, many not having been refurnished since the business was started, which may be from 50 to 100 years. As a result, there is a tremendous amount of antiquated office furniture in use which is replaced only when the firm moves into new quarters. There is, however, a great activity in the erection of new office buildings in London and also in the provincial cities so that the outlook for increasing sales of furniture is bright. But it is doubtful if there is much opportunity for American manufactured goods, exports of which to the United Kingdom, according to official statistics, were valued at only $33,399 (consisting of about one-third chairs and two-thirds furniture) during 1926, indicating that it can not compete in price with the domestic-made product.

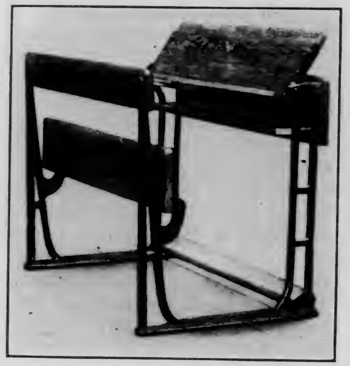


FIG. 29.—Dual desk with lift top and tilting seat

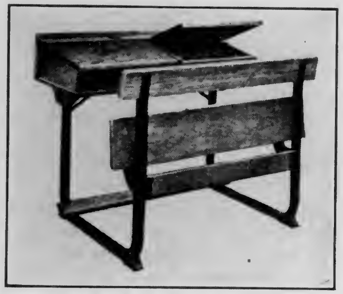


FIG. 30.—Dual desk with locker

SCHOOL FURNITURE

The manufacture of school furniture in Great Britain is a specialized branch of the industry and there are not more than a dozen firms of note in the entire country that make it.

Most desks are made according to designs patented by the manufacturers, the patented idea, however, applying more to the design of the metal and the method by which the woodwork is fitted to the metal supporting standards than to the design of the desk itself. The sizes of school desks are standardized with the heights carefully graded, the comparative height of desk and seat being proportionate to meet the different standards, the distance from floor to seat being about 62 per cent of the total height.

The "dual" desk is used in all British elementary schools and is 3 feet 4 inches long with a height from the floor to the lowest edge of the writing slope varying from 25 to 32 inches, and height of seat varying from $15\frac{3}{8}$ to $19\frac{1}{8}$ inches, with a 13 to 14 inch desk slope. One of the most popular "dual" desks has a writing slope which may be lifted, the underside of which is provided with a suitable ledge for a book shelf, a tilting seat, strengthening stretcher rail below, and foot rail. Another type of "dual" desk is divided into two compartments each with separate lids. Both these types of desks are made either with or without a fixed inkwell rail and fitted with both steel and cast-iron standards.

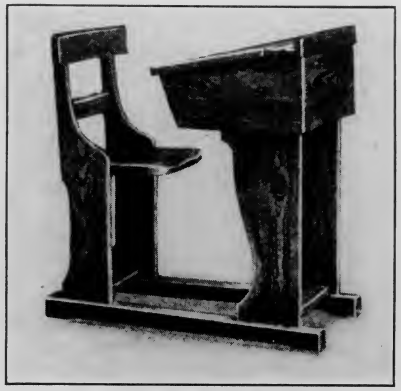


FIG. 31.—Single desk with locker

Single desks are nearly always fitted with lockers and are usually made entirely of wood, 22 or 24 inches in length, 18 inches in width and heights to lowest edge of writing slope of 26, 28, 30, 31, 32, and 33 inches. Unlike the "dual" desk, it is not fitted with a seat but a separate chair must be used. These, however, are not made by the desk manufacturers but are purchased by them ready-made.

Desks are seldom found in the infants' department of elementary schools, kindergarten tables 18 to 21 inches in height being employed instead.

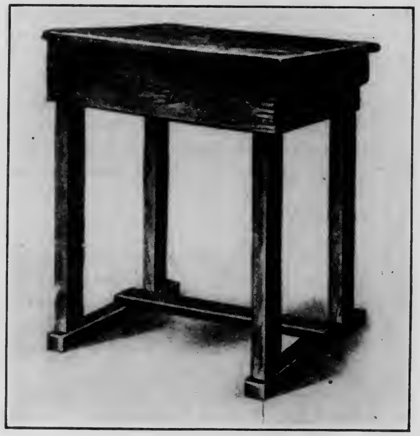


FIG. 32.—Table desk

In addition to desks, manufacturers of school furniture also make cupboards, teachers' desks, blackboards, easels, model stands, and writing slopes. Oak and southern pine are used for the better type of these to conform with the desks and north European pine, stained and varnished, for the less expensive, the cupboards being frequently backed with three-ply or five-ply alder. As it is important that the chalk be easily removed from a blackboard an absolutely smooth surface is essential. Formerly Canadian white pine was largely used for this purpose but it has now been replaced by plywood.

For laboratory work tables with teak tops and an underframing of southern pine are generally employed. Some school-furniture manufacturers also make screens and partitions used to divide classrooms into smaller units, Douglas fir being preferred for this purpose.

Woods used.—About 60 per cent of the school desks now made in Great Britain are of American oak and the remainder of southern pine. In pre-war days the latter wood predominated but its appreciation in value since that time has caused the demand to turn toward oak. The stock generally used is 1 and 1¼ inches by 8 inches and wider, extra prime. Both red and white No. 1 common and select plain oak are used, the red being preferred where the furniture is to be given a brown finish, while the white is used for the lighter finish. During the war, when these two woods were difficult to obtain, experiments were made with various native species, but without success, and to-day oak and southern pine, both from the United States, have a virtual monopoly of the school-desk trade.

MOISTURE CONTENT OF LUMBER

In Great Britain, where for long periods the air is saturated with moisture and where a number of rooms in most British houses are damp for long periods of the year, because of the absence of central heating, swelling has to be guarded against as much if not more than shrinking. As a result of these conditions the question of drying lumber down to a low moisture content is not so imperative as under American conditions.

The question of determining the best moisture content of furniture lumber has been under consideration by the British furniture industry for some time past and has not yet been definitely settled, but experiments made so far point to the correct percentage of moisture being somewhere between 10 and 14 per cent, probably about the middle point.

DIMENSION STOCK

The furniture industry is the largest consumer of dimension stock in Great Britain. It is imported in the form of squares, principally oak from the United States (red and white, quartered and plain sawn) and central Europe, beech from Czechoslovakia, a little black walnut from the United States, and birch from Finland. These are used for the legs of tables and dressing tables, also bedposts.

The sizes most in demand are as follows: 4 by 4 by 28 and 30 inches; 3½ by 3½ by 28 and 30 inches; 3 by 3 by 28 and 30 inches; 2½ by 2½ by 28 and 30 inches; 2 by 2 by 28, 30, 36, 42, 48, and 54 inches; 1¾ by 1¾ by 30 and 33 inches; and 1½ by 1½ by 28, 30, 38, 42, 48, and 54 inches.

Grade.—The following is a grade frequently called for by British importers catering to this trade: "To be all heart, free of all defects, i. e., knots, shakes, and wormholes; to be cut full so as to finish to the exact sizes given when dry."

Claims are frequent on squares on contracts calling for "dry" stock. It is never advisable to use the term "dry," which is subject to many interpretations, and it is suggested that one of the following be used instead, thereby avoiding much trouble: "Shipping dry," "skin dry," "— months on sticks."

USE OF PLYWOOD

Plywood is being used to an increasing extent in the manufacture of furniture. For table tops, bedstead head and foot ends, wardrobe sides and doors, okoumé (gabon) and north European birch and alder are mostly employed as a core for veneer of mahogany, walnut, or fancy woods. It is for the heavier work that the laminated okoumé board is mostly in demand. For backs of wardrobes, cabinets, partitions, panels, and drawer bottoms the lower qualities of European birch and alder, and Japanese and Siberian ash, are used, depending largely upon the class of furniture being made.

EXHIBITIONS

The British furniture industry holds annual exhibitions in London, Manchester, and Scotland, at which advance styles for the coming season are shown. By far the most important of these is that held in London during the first week of February each year. These exhibitions are restricted to the trade only and the one held in London in 1927 was visited by over 40,000 buyers and furniture valued at over £250,000, specially constructed for the occasion was exhibited.

FUTURE OUTLOOK

Since the war there have been approximately 1,000,000 houses built in Great Britain but, owing to the industrial depression that has existed since the postwar boom of 1920, very little has been done in the way of refurnishing them. Untold numbers of houses in the great industrial and mining centers are furnished with the barest necessities, their occupants in many cases living entirely on Government or municipal relief. Although there were at the end of 1927 still over 1,000,000 unemployed in the country, there are signs that industry is surely, if slowly, reviving and as the wage-earning classes secure steady employment and pay off their debts an increased interest in furniture may be anticipated.

The method of selling on the installment plan is also growing in the retail furniture trade and is likely to increase still further in the future.

Taking both factors into consideration, the outlook is favorable for increased sales of furniture as trade improves and with it the demand for American hardwood lumber largely used in its manufacture.

IMPORTANCE TO AMERICAN LUMBER EXPORTERS

The British furniture industry is of paramount importance to American exporters of hardwood lumber and is to a large extent the balance wheel of the United States hardwood trade.

During 1926, according to official statistics published by the United States Department of Commerce, exports of hardwood lumber to the United Kingdom, largely used for the manufacture of furniture, were as shown in the following table:

Kind	Quantity	Value
	Feet	
Oak	97, 335, 000	$6, 483, 384
Gum	20, 184, 000	1, 042, 032
Mahogany	15, 096, 000	2, 000, 623

In addition to these, other woods, such as tupelo, yellow poplar, black walnut, and chestnut, are used, the most important being the first named, which is being utilized for drawer sides and backs to an increasing extent.

COOPERAGE

IMPORT TRADE

Great Britain has little native timber available for manufacturing cooperage; consequently, practically all its needs have to be met by importation.

Imports of staves have been very erratic since the armistice, varying considerably, and during the past six years—particularly so far as oak staves in brewery sizes are concerned—imports have been reduced to a minimum, owing to the necessity of absorbing the great stocks brought in during the boom year of 1920. During that year stave imports into Great Britain were valued at £3,640,806, and a large portion was left on the importers' hands, with disastrous results to many.

British statistics do not segregate the different kinds of cooperage imported, but lump them altogether under one general heading. The figures in the following table showing imports of staves of all kinds into Great Britain, therefore, include all kinds of staves, from the expensive "Memel" oak staves used by the brewing industry to the cheap fir (pine and spruce mixed) stave used principally for the manufacture of containers for cement and dry chemicals.

Year	Loads of 50 cubic feet	Value	Year	Loads of 50 cubic feet	Value
1913	182, 128	£1, 000, 048	1922	75, 021	£736, 737
1919	84, 602	1, 363, 189	1923	84, 299	564, 038
1920	155, 671	3, 640, 806	1924	128, 735	1, 117, 374
1921	51, 121	1, 411, 079	1925	115, 964	917, 609

NOTE.—From Apr. 1, 1923, the figures include the trade of Great Britain and Northern Ireland with the Irish Free State. From the same date the direct foreign trade of the Irish Free State has been excluded.

SOURCES OF SUPPLY

Great Britain goes to many countries for its cooperage requirements, and during 1924, the last year for which statistics are available, the principal sources of supply were as shown in the following table:

Country of origin	1913		1924	
	Value	Loads of 50 cubic feet	Value	Loads of 50 cubic feet
Poland (including Danzig)	(1)	(1)	£272, 622	13, 471
Sweden	£115, 680	38, 826	213, 805	40, 963
United States	266, 670	30, 733	179, 409	14, 786
Finland	(1)	(1)	126, 798	31, 323
Russia	485, 403	92, 479	120, 884	9, 480
Latvia	(1)	(1)	89, 316	8, 006
Lithuania	(1)	(1)	44, 867	1, 998
Norway	50, 873	15, 160	38, 349	6, 630
Germany	64, 899	3, 165	----------	----------
All other	16, 523	1, 765	31, 324	2, 078
Total	1, 000, 048	182, 128	1, 117, 374	128, 735

[1] Included in Russia.

NOTE.—From Apr. 1, 1923, British statistics include the trade of Great Britain and Northern Ireland with the Irish Free State. From the same date the direct foreign trade of the Irish Free State has been excluded.

During 1913 Poland, Finland, Latvia, and Lithuania are not shown as furnishing any of Great Britain's stave imports, because it was not until the treaty of Versailles in 1919 that the countries named were separated from the Russian Empire.

Germany is reported as supplying Great Britain with staves to the value of £64,899 in 1913. These staves, however, were not manufactured in Germany but in Russia, and exported through the ports of Memel and Danzig, then in the German Empire. Staves from the same area are still being shipped, but Memel is now part of the Republic of Lithuania, while Danzig is a free port and the principal outlet for staves originating in Poland.

POLAND (INCLUDING DANZIG), RUSSIA, LATVIA, AND LITHUANIA

These countries, although separate geographically, may be regarded as one in considering the British sources of stave supply, for, with the exception of small quantities of pine and spruce staves shipped from Poland and Latvia for the manufacture of containers used by the cement, dry chemical, and pottery industries, all the staves imported from them into Great Britain are made of oak timber grown in the forest of Volhynia.

The Volhynia forest lies partly in Poland and partly in the Ukraine district of Russia, but the latter country, in addition to exporting through its own ports of Leningrad and Odessa, finds it convenient to use also Riga and Libau in Latvia and Memel in Lithuania, and for that reason these countries are erroneously credited with stave exports which properly belong to Russia. Poland has used the Free Port of Danzig for its stave exports.

The Polish and Russian oak staves are entirely handmade by workers whose skill embodies the results of generations of training, so that a practically perfect stave is produced. These staves are known as the "Memel" type, and not only is the manufacture perfect but the alleged freedom from tannin of the oak from which they are manufactured has given this type of stave a virtual monopoly in the British brewing industry.

This is the most valuable stave imported into Great Britain, the full-size pipe, 3 by 6, 66 to 73 inches, being worth in November, 1926, approximately $2,500 per mille of 1,200 pieces.

SWEDEN, FINLAND, AND NORWAY

The Scandinavian countries and Finland are the principal sources of Great Britain's supply of staves for the manufacture of containers used by the cement, pickled herring, dry chemical, and pottery industries. Of these countries, Sweden is the most important, for the reason that in addition to the large quantities of spruce and pine staves (commercially known as "fir" and shipped mixed) used for containers of cement, dry chemicals, and pottery ware, Swedish spruce staves are used almost exclusively for the manufacture of pickled-herring barrels.

Finland ranks next in importance and with the development of its timber industry is supplying a large proportion of Great Britain's requirements for staves used to make containers used in the above-mentioned industries.

Norway is of much less importance than either Sweden or Finland as a provider of staves for the British market, and the quantity imported from that country during 1924 was less than one-half of the 1913 total. Although a small quantity of spruce staves are imported for the manufacture of pickled-herring barrels, most of them are the mixed spruce and pine used to make cement containers.

THE UNITED STATES

Next to Argentina the United Kingdom was the most important foreign market for American staves in 1925, exports to the United Kingdom during that year being valued at $1,151,000. Tight staves numbering 7,798,698, slack numbering 1,647,142, 476,273 sets of heading, 19,053 sets of tight shooks, and 24,668 empty barrels made up this value.

Of the staves imported into Great Britain from America, the most important are oak, used principally for the manufacture of palm-oil casks and whisky barrels and to a small extent for vinegar barrels, churns, and tubs. Next in importance to the oak are the gum staves—tight for glucose and slack for flour barrels. In addition to these, small quantities of hardwood staves are imported for making pork barrels and miscellaneous containers.

The heading imported into Great Britain from America is largely of oak for whisky and gum for flour barrels.

The importation of American tight oak shooks has made little headway in Great Britain. During the postwar boom and since, sample shipments have been made by American exporters anxious to develop this trade, but so far with little success. The conservatism of the British cooperage industry is probably an important factor, but the trade asserts that the barrel made locally from staves is better than one assembled from the imported shook.

Another objection is said to be the fact that most British coopers making oak barrels work on a piecework basis at a rate of so much per barrel and are paid the same, whether it is manufactured from staves or assembled from the shook. As the shook costs more than the staves, it is not profitable to use shooks.

However true the statements may be, the fact remains that little headway has been made in selling tight shooks in the British market.

A large business is done by the United States with Great Britain in secondhand empty barrels, which are preferred to new ones by some producers of palm oil, because the used barrels absorb less oil.

In addition to staves and heading, a small quantity of coiled elm hoops for flour barrels is imported from America.

New Orleans, Mobile, Galveston, Savannah, Baltimore, and Norfolk are the principal shipping points for American staves.

PRINCIPAL IMPORTING CENTERS

The principal ports of entry for staves in Great Britain, with the quantities handled through each during 1924, the last year for which figures are available, are shown in the following table:

Port	Loads of 50 cubic feet	Value	Port	Loads of 50 cubic feet	Value
England:			Scotland:		
London	38,472	£347,550	Fraserburg	7,561	£52,116
Liverpool	15,199	134,230	Leith	5,020	113,743
Rochester	14,849	55,738	Peterhead	3,825	24,133
Manchester	8,260	81,938	Aberdeen	2,330	13,623
Yarmouth	5,079	28,520	Glasgow	1,730	26,809
Fowey	2,254	11,602	Lerwick	1,525	9,553

The kind of cooperage imported through each particular port is determined by the consuming industries in their proximity. With the exception of London, Liverpool, and Manchester, which handle many kinds of cooperage stock for distribution to near-by towns, other ports, generally speaking, cater to one local industry only.

METHODS OF IMPORT TRADE

The import trade in Great Britain for both American and European staves is usually handled through agents acting as exclusive sales representatives for the foreign shipper. These agents not only effect the sales but also handle the documents and carry the del credere—i. e., guarantee the solvency of the buyer. There are no agents handling staves exclusively, but the import business is done through lumber agents and, except for the European softwood staves, by firms usually having a separate department to take care of it. Not all lumber agents, however, handle hardwood staves, as this business necessarily requires special knowledge, and agency arrangements should not be made except with such firms as are properly qualified.

Stave agents are expected by the trade to confine their sales to recognized importers who, in turn, sell to the consumers. Although there may be some deviation from this procedure, American exporters would be well advised not to depart from the customary channels of trade.

LOCATION OF PRINCIPAL AGENTS

The principal stave agents in Great Britain have their headquarters in London, Liverpool, and Glasgow, and from those cities they cover the whole of the country, either through branch offices or by traveling salesmen.

While a London or Liverpool agent may cover all of England, it is desirable that a separate one should be appointed for Scotland, unless the agent has an office in that country also.

TERMS OF SALE

Quotations for American, Russian, and Polish hardwood staves are made per mille of 1,200 pieces, and the customary terms charged by agents are 4 per cent for sales commission and del credere and 2½ per cent discount, both computed on the c. i. f. value. On the other hand, European softwood staves are sold on the basis of the Petrograd standard of 1,980 board feet, the usual deduction for commission, del credere, and discount being 5½ per cent on the f. o. b. value. It is customary for the draft to be drawn by the exporter on the agent at from three to five days' sight for amounts varying from 75 to 95 per cent of the net invoice value, according to arrangement, the remainder being remitted on arrival and acceptance of the goods.

A complete set of documents must be attached to the draft, including an "on board" bill of lading, invoice, specifications, and policy of insurance acceptable to the buyer. It is usual to insure for 10 per cent over the invoice value to cover buyers' anticipated profits.

AMERICAN QUOTATIONS

American quotations are, for the most part, in sterling but occasionally in dollars per mille of 1,200 pieces. Although sales to England are usually made on a c. i. f. basis, Scottish importers prefer to buy ex quay. In the event a sale is made on this basis, the shipper is responsible for the landing charges, and care should be taken to ascertain what these are before making an ex-quay quotation. These charges vary in different ports, being much heavier in some than others, and unless the proper provision is made for them in computing the selling price the returns are liable to be considerably less than anticipated.

CONTRACTS

For sales of European softwood staves the regular standard form of lumber contract is used, as they are to all intents short pieces of lumber. For other kinds, including those imported from America, each agent uses his own contract—usually a blank with the specific conditions pertaining to the particular sale typewritten in.

There are no definite rules governing these conditions, but they are based on English usage with which the trade is thoroughly familiar.

For those items handled by members of the Associated Cooperage Industries of America, the rules of that association govern the contract. All contracts, however, have a clause providing for arbitration in the event a dispute can not be settled by amicable methods.

CLAIMS

Claims for quality are not frequent, according to agents handling American staves. The stave business is highly specialized and requires considerable technical knowledge, so that it is confined exclusively, both in America and Great Britain, to those conversant with it. Many American manufactures employ stave makers trained in the oak-stave districts of central Europe, whose product has the reputation of being unsurpassed.

Of the comparatively few complaints made against American staves, the principal one is said to be for sap damage, caused by the staves having been stored for so long a time before shipment that the sapwood has become porous. Generally speaking, American exporters know what the British market requires and are careful to supply it.

CONSIGNMENTS

Importers look upon stave consignments as an opportunity to get a bargain after the charges for yarding and storage have become so heavy that they must be disposed of, according to the statement of a British stave agent. These consignments invariably result in a heavy loss to the shipper, and American stave exporters should take warning against indulging in such a practice. Consignments not only result in a direct loss to the shipper who makes them but they ruin legitimate trade, as it is difficult to persuade an importer to place a firm order for future delivery when, by waiting, he knows it is more than probable that he will be able to fill his requirements at his own price from stocks shipped unsold. Although during the immediate postwar boom stave consignments may have been profitable to American exporters, it is certain that they have not been since, nor are they likely to be again for a long time to come. The only way by which the trade in staves with Great Britian can be profitable is by restricting it to a firm order basis.

IMPORTERS

There are comparatively few stave importers in Great Britain, and the amalgamation of numerous Irish and Scottish distilleries during recent years has concentrated the buying of American whisky staves in comparatively few hands.

In addition to the regular importers who supply the coopers with their requirements, some of the larger consumers, who operate their own cooperage plants, are, because of their size and importance, recognized as importers in the trade and buy on importers' terms. This, however, is exceptional, and because it is done in a few particular instances the selling direct to consumers by American stave exporters can not be advocated. The regular custom of the trade in dealing with importers through an agent should be adhered to.

SALES BASIS

American staves are sold on the basis of average width, the usual being 4½ inches inside the sap; in other words, 1 mille is the equivalent of 5,400 inches and the invoice is computed accordingly. In order to prevent the inclusion of too many narrow staves, contracts occasionally limit the number of pieces to 1,200 to the mille.

TRADE ASSOCIATION

There is no trade association exclusively representing the stave import trade, but many of those interested in it are members of the Timber Trade Federation of the United Kingdom.

KINDS AND USES OF COOPERAGE IMPORTED

Cooperage in all its forms is imported into the United Kingdom, but of most importance are the tight staves.

Tight cooperage is, with few exceptions, made from imported oak staves, and it is used for the transportation and storage of malt and spirituous liquors, palm oil, kerosene, cured fish and vinegar, and for the manufacture of tubs and churns. The principal exceptions are the barrels used by the pickled-herring industry, which are made of Swedish spruce, and those to hold glucose, for which American gum is preferred.

TIGHT SHOOKS

Although attempts have been made from time to time by American exporters to induce the British cooperage industry to use tight shooks instead of staves for the manufacture of barrels, little headway has been made so far. The glucose industry, however, is an exception, and it is probable that most of the 19,053 sets of tight shooks, valued at $32,611, exported from the United States to the United Kingdom during 1925 were of gum and were used for the manufacture of glucose barrels.

SLACK STAVES

North European and Baltic spruce and pine staves sold as fir are imported into the United Kingdom in very large quantities for the manufacture of containers for cement and dry chemicals and, to a smaller extent, for pottery. In addition to these, some American slack gum staves are imported for making flour barrels. During 1925 the United States exported 1,647,142 slack staves, valued at $74,846, to this market, most of which were probably used to make containers used by the flour-milling industry for their export trade.

HEADING

Of the heading imported into the United Kingdom, that of oak and gum from America is the most important, a total of 476,273 sets, valued at $168,715, being exported from the United States to the British market during 1925.

EMPTY BARRELS AND CASKS

Some new empty oak barrels are imported for use by the British brewing industry, principally from Germany and the Netherlands, made from Russian and Polish staves. The number, however, is comparatively small and their importation is not looked upon with favor by the British cooperage industry.

Empty secondhand casks to the number of 24,668, valued at $194,597, were also imported from the United States during 1925. After cleaning and repairing, they are knocked down and shipped to West Africa in shook form for use as palm-oil containers.

There is also a considerable business done in other secondhand barrels, which are imported filled with packing-house products, paraffin, and edible oils, principally from America. After being emptied of their contents, cleaned and repaired, they are sold for use as containers for products similar to those which they originally held.

HOOPS

American elm hoops, 5, 5½, and 6 feet in circumference, are also imported by Great Britain for use on flour barrels and other containers for dry material, but the quantity is not shown in any available statistics.

CONSUMING INDUSTRIES

BREWING

Barrels manufactured from what are called "Memel" oak staves are used exclusively by the brewing industry in Great Britain. These staves were originally shipped through the German port of Memel for convenience, although manufactured in the Russian Province of Volhynia, but for many years the name "Memel" has been used to indicate a type of stave rather than the port of shipment.

The "Memel" type of stave is excellent in manufacture and grading, cleft and flat dressed by hand to an exact thickness and width, and in "crown" quality is practically free from all defects. Russia and Poland together supply the entire stave needs of the British brewing industry.

During the war it was impossible for Great Britain to get supplies of staves from these countries, so that the brewing industry was compelled to go to the United States for them. However, it is asserted that oak staves from the United States are not satisfactory for beer barrels on account of the tannin flavoring the beer, so that as soon as European staves were again available the trade returned to their use. As a consequence there has been a surplus of American staves in brewers' sizes in Great Britain ever since the close of the war. Efforts on the part of United States stave exporters to induce the resumption of the use of American staves for beer casks so far have been unsuccessful; consumption has now been reduced to meager proportions and there does not appear to be any prospect of immediate revival. Although the "Memel" stave may not have any inherent superiority over the American, the fact remains that the countries where it originates produce a perfectly made stave, which has for generations found favor in Great Britain for the making of beer casks.

Quotations for "Memel" staves and heading are in pounds sterling per mille of 1,200 pieces, as of full-size pipe, or per "shoeck" of 60 pieces computed according to a standard base table known as "The Memel reduction table," using the full-size pipe, 66 to 73 inches, 3 by 6 inches as a base. The following are the standard dimensions of "Memel" staves and heading: 3 by 6, 2½ by 5, 2¼ by 4½, 2 by 4, 1¾ by 3½, 1½ by 3, 1¼ by 3, and 1 by 3 inches, with lengths for pipes 66 to 73 inches, brandies 58 to 65 inches, long hogshead 52 to 57 inches, hogsheads 46 to 51 inches, long barrel 38 to 45 inches, short barrel 34 to 37 inches, long heading 26 to 33 inches, short heading 20 to 25 inches, short short heading 17 to 19 inches, and ends 15 to 16 inches. It will be noted that the width is always double the thickness of the stave.

PALM OIL

Liverpool is the center of the United Kingdom palm-oil trade, it being estimated that over 90 per cent of the palm oil imported into Great Britain from West Africa comes through this port. The

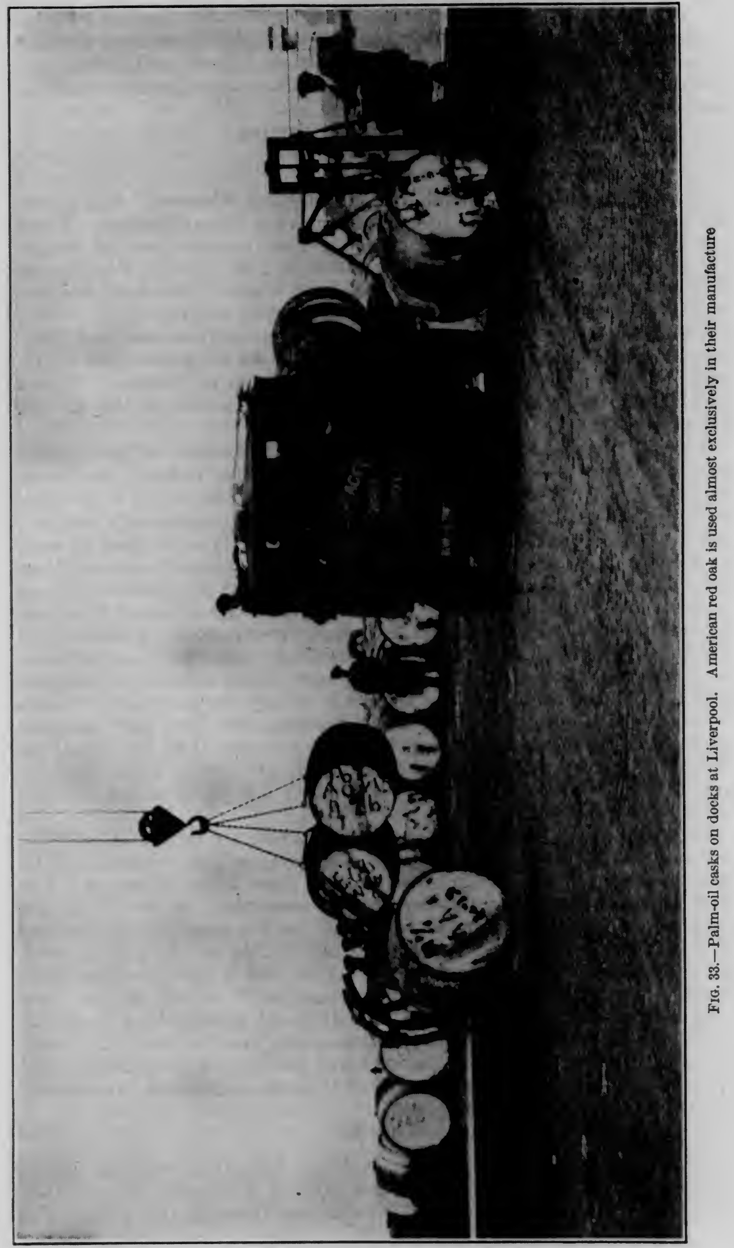


FIG. 33.—Palm-oil casks on docks at Liverpool. American red oak is used almost exclusively in their manufacture

palm-oil cask must be of exceedingly strong construction in order to stand rough handling by native African labor. When full of oil it weighs between 1,600 and 1,700 pounds; the barrels are rolled for many miles on the rough roads, and it is essential that they can stand this treatment without leakage. The palm-oil cask of to-day is the outcome of many years' experience. It is large, carries a heavy weight under varying conditions, has to stand recoopering and many long voyages, and must be strong enough at the head to be slung with hooks when filled, as well as of sufficient strength on the bilge to be stored without damage.

The materials now used for the manufacture of these palm-oil casks are the best that can be procured, and for this purpose American staves have been found superior to all others and are used exclusively by coopers supplying this trade.

Palm-oil staves are shipped to Great Britain principally from New Orleans and Galveston, and are chiefly of red oak. They may be either flat or circle bucked, and are imported both listed and unlisted. Listed staves are those which have square edges, while the unlisted are shipped as they leave the bucking machine, without any dressing of the edges.

The following stave specifications are used for the manufacture of palm-oil casks: 44 by 1⅛ inches, prime white and/or red oak, flat or circle dressed, listed 5 inches, average; 44 by 1⅛ inches, prime white or red oak, flat or circle dressed, unlisted; 44 by 1⅛ inches, second quality, white or red oak.

The second-quality staves are used in small quantities only. Heading for the casks is manufactured by local coopers out of third or fourth quality Canadian white or red pine lumber. The heading is finished to 38 and 40 inches diameter, principally the former, by 1½ inches thick. At opposite sides of the heading is inserted a small piece called a "cantel," which is made of oak, to strengthen the heading and to allow for the binding by the hoops.

Efforts have been made to introduce American palm-oil shooks into Liverpool, but so far they have made little headway.

The casks are sold by the coopers to firms engaged in the palm-oil trade and shipped to West Africa in shook form, whence they are returned filled with oil and distributed to the soap and tin-plate manufacturers, who are the largest consumers of palm oil. After being emptied they are resold to the coopers, who repair those that are damaged, and after cleaning and shooking they are sold again to the operators and reshipped to West Africa.

There is also a considerable demand for secondhand casks—in fact, they are preferred to new ones by some palm-oil operators on account of their absorbing less oil. While a sufficiently low ocean freight obtained in recent years, quantities of empty palm-oil casks were shipped to Liverpool from America and sold to the coopers. These casks, after being cleaned and repaired if necessary, were converted into shooks, and resold to the palm-oil operators for shipment to West Africa again. The Liverpool Produce Association specification for regular palm-oil casks (the regular size of a Liverpool palm-oil cask is 38 inches and is known as a 38-inch cask), November, 1920, new or secondhand, follows:

Staves.—The staves shall be of oak, of a minimum length of 42 inches, with an allowance of 1 inch for wear and tear, and of a thickness of 1 to 1¼ inches.

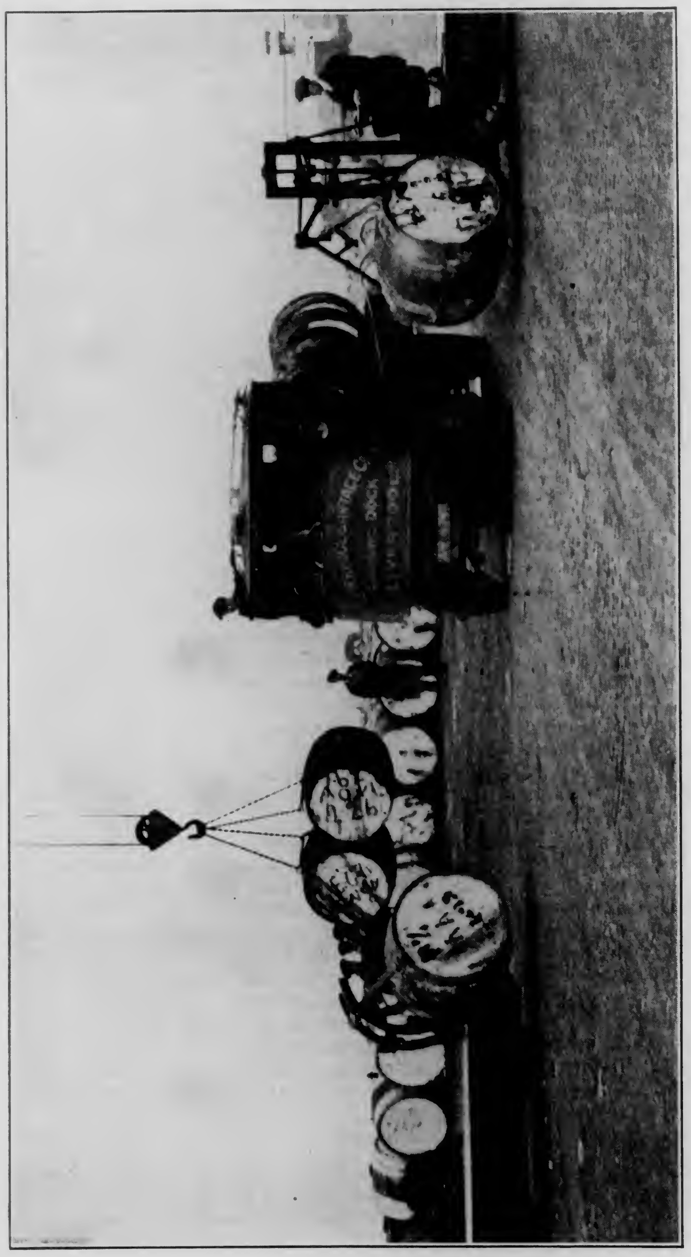


FIG. 33.—Palm-oil casks on docks at Liverpool. American red oak is used almost exclusively in their manufacture

palm-oil cask must be of exceedingly strong construction in order to stand rough handling by native African labor. When full of oil it weighs between 1,600 and 1,700 pounds; the barrels are rolled for many miles on the rough roads, and it is essential that they can stand this treatment without leakage. The palm-oil cask of to-day is the outcome of many years' experience. It is large, carries a heavy weight under varying conditions, has to stand recoopering and many long voyages, and must be strong enough at the head to be slung with hooks when filled, as well as of sufficient strength on the bilge to be stored without damage.

The materials now used for the manufacture of these palm-oil casks are the best that can be procured, and for this purpose American staves have been found superior to all others and are used exclusively by coopers supplying this trade.

Palm-oil staves are shipped to Great Britain principally from New Orleans and Galveston, and are chiefly of red oak. They may be either flat or circle bucked, and are imported both listed and unlisted. Listed staves are those which have square edges, while the unlisted are shipped as they leave the bucking machine, without any dressing of the edges.

The following stave specifications are used for the manufacture of palm-oil casks: 44 by 1⅛ inches, prime white and/or red oak, flat or circle dressed, listed 5 inches, average; 44 by 1⅛ inches, prime white or red oak, flat or circle dressed, unlisted; 44 by 1⅛ inches, second quality, white or red oak.

The second-quality staves are used in small quantities only. Heading for the casks is manufactured by local coopers out of third or fourth quality Canadian white or red pine lumber. The heading is finished to 38 and 40 inches diameter, principally the former, by 1½ inches thick. At opposite sides of the heading is inserted a small piece called a "cantel," which is made of oak, to strengthen the heading and to allow for the binding by the hoops.

Efforts have been made to introduce American palm-oil shooks into Liverpool, but so far they have made little headway.

The casks are sold by the coopers to firms engaged in the palm-oil trade and shipped to West Africa in shook form, whence they are returned filled with oil and distributed to the soap and tin-plate manufacturers, who are the largest consumers of palm oil. After being emptied they are resold to the coopers, who repair those that are damaged, and after cleaning and shooking they are sold again to the operators and reshipped to West Africa.

There is also a considerable demand for secondhand casks—in fact, they are preferred to new ones by some palm-oil operators on account of their absorbing less oil. While a sufficiently low ocean freight obtained in recent years, quantities of empty palm-oil casks were shipped to Liverpool from America and sold to the coopers. These casks, after being cleaned and repaired if necessary, were converted into shooks, and resold to the palm-oil operators for shipment to West Africa again. The Liverpool Produce Association specification for regular palm-oil casks (the regular size of a Liverpool palm-oil cask is 38 inches and is known as a 38-inch cask), November, 1920, new or secondhand, follows:

Staves.—The staves shall be of oak, of a minimum length of 42 inches, with an allowance of 1 inch for wear and tear, and of a thickness of 1 to 1¼ inches.

Heads.—The heads shall be of white or red pine, with two oak cantels, and of a thickness of 1⅜ to 1⅝ inches.

Hoops.—The hoops shall be 10 in number, and of 2 inches by 14 Birmingham wire gauge.

Width.—The outside diameter at ends of cask shall be from 38 to 44 inches.

KEROSENE

The use of wooden containers for kerosene has been decreasing for some years in this market, being replaced to a large extent by road tank wagons and metal storage tanks. Secondhand barrels, which are used over and over again, fill most needs of the oil industry, and new barrels are made only to supplement supplies of the old.

As dealers will not pay any more for kerosene delivered in new barrels, old barrels are used whenever they are available. The new barrels are made almost exclusively by the large oil companies, which operate their own cooperage plants. These companies do not buy their stave and heading requirements from regular importers in Great Britain, but get their supplies direct from the United States.

Under these circumstances, so long as supplies of secondhand barrels and such new ones as are made by the oil companies themselves are sufficient to meet the demand, there will be no call for oil barrels from the cooperage industry, and the necessity for importing staves and heading to make them will not arise. Consequently, imports by the stave importers have virtually ceased, being confined to a small quantity of heading for repair purposes only.

American red and white oak are used exclusively for making oil barrels, the staves being circle sawn, kiln dried, and jointed 34 by ¾ inch, average 4½ inches wide. The heading is circled, rushed, doweled, and beveled (completely finished), 20½ inches diameter by ¾ inch, random widths. In addition, some square heading 22 by ¾ inch, random widths, is imported for repair work.

The regulation kerosene barrel is made in one size only and has a capacity of from 40 to 42 British gallons.

HERRING

Large quantities of staves are imported into the United Kingdom every year for the manufacture of barrels in the export pickled-herring trade. The principal herring-curing centers are Yarmouth, Lowestoft, and the Isle of Man, in England; Fraserburg, Peterhead, Aberdeen, and Wick, in Scotland; Larwick, in the Shetland Islands; Stronsay, Orkney Islands; and Stornaway, in the Hebrides. It is through these ports that the staves are imported and made into barrels by local coopers and the fish curers. The herring are brought in by drifters, cleaned, and packed in salt for export.

Herring barrels are manufactured largely from flat-sawn spruce staves imported from Sweden, and to a small extent from Norway, but the quality and selection, with a few exceptions, are not considered by the consumers as favorably as that grown in Sweden.

Small quantities of pine staves from Norway are occasionally imported, this pine having been found suitable for pickled-herring barrels.

Some spruce logs are also imported from Sweden and the White Sea (Russia), the latter being considered the best, and manufactured into staves by local coopers, but these staves have not been found as suitable for barrel making as the imported, according to those interested in the consuming industry. This business, however, is comparatively small and is mostly confined to Aberdeen.

In addition to the imported staves and those made out of logs, a fair number are also manufactured in Scotland out of north European spruce lumber and are cut as follows: 2 by 3, 3½, 4, and 4½ inches, three staves to the piece; 1½ by 3.3, 3½, 4, and 4½ inches, two staves to the piece; 1¼ by 3, 3½, 4, and 4½ inches, two staves to the piece.

The 2-inch stock is cut into staves to make whole and half barrels; the 1½-inch for whole barrels; and the 1¼-inch for half barrels.

The following are the principal sizes of the staves used in the manufacture of herring barrels: Whole barrels, 31 by 11/16 inch, 2½ to 5 inches; half barrels, 24 by 9/16 inch, 2½ to 4½ inches; quarter barrels, 18 by ½ inch, 2 to 3½ inches.

Apart from a small quantity of heading made from the imported Swedish and Norwegian spruce lumber, there is also imported heading material 18 inches and in multiples thereof in length, ¾ by 4 inches and wider. Apart from these, Scotch fir heading 18 inches in diameter, ¾ by 4 inches and wider, is used almost exclusively in England and Scotland for herring barrels.

In addition to the pickled-herring industry, there is also a small business done in pine and spruce flat-sawn staves imported from Sweden, Finland, and Norway for the manufacture of dry-fish barrels. The dimensions of the staves and heading used for these are as follows: Staves—25 by ⅜ inch, to 2½ to 5 inches; 19 by ⅜ inch, 2½ to 5 inches; heading—16 by ⅝ inch, 3 to 9 inches; 13 by ½ inch, 3 to 6 inches.

British importers of herring staves generally place their orders during October to December for shipment during the ensuing season, which opens about the middle of May.

The market prices for spruce pickled-herring staves in November 1926, for delivery during the coming season, was from £16 to £17 per Petrograd standard of 1,980 board feet f. o. b. loading port. Based on an estimated ocean freight rate of 55s. per standard, this would be equal to a price of £19 15s. c. i. f. British ports.

CEMENT

Although sacks are used as containers for cement in the British domestic market, very large quantities of it are exported, the greater proportion being shipped in barrels. About one-third of the cooperage imported into the United Kingdom during 1924 was for the cement industry. Sweden and Finland are the principal sources of supply, followed to a small extent by Latvia and Poland. Some sample shipments of Rumanian spruce have also been received, but opinions differ as to its suitability for cement barrels.

The staves used for making cement containers are flat-sawn and may be of either pine or spruce, and are sold in Great Britain as fir. The usual specifications are as follows: "Good merchantable quality, well manufactured, suitable for making up into cement barrels by machinery." Sizes are ½ by 28 inches, 2 to 5 inches wide, maximum, 10 per cent 2 inches for stave and ½ by 3 to 7 inches, 17 and 18 inches for heading. The principal ports of entry are London and Rochester (the Medway), followed by Manchester and Cardiff, although of considerably less importance than the two former. Efforts have been made by a leading cement manufacturer in the past to buy American Douglas-fir staves, but it was found they could not be delivered here at prices competitive with the north European product.

Many contracts for north European cement staves are placed at the end of one shipping season for shipment during the ensuing one, dependent on the buyers' ideas of the future trend of the market. Shipments are principally during June to August, on account of the favorable ocean freight rates and insurance obtaining then. It is customary for the British importers to purchase their stave requirements f. o. b. loading port in the country of origin and cover their own tonnage requirements.

The Swedish cement stave is preferred to all others in Great Britain and brings about 10s. per standard more than the Finnish product.

GLUCOSE

American tight gum sawn staves imported in shook form are used for making glucose barrels in Great Britain. Staves 36 by ¾ by 4½ inches average are used for the large barrels containing 54 United States gallons, and 30 by ¾ by 4¼ inches average are used for small barrels containing 34 United States gallons. Gum heading is also used 21 by 17½ inches in diameter by ¾ inch thick, rushed, beveled, and doweled. The grading rules of the Associated Cooperage Industries of America apply to both staves and heading.

FLOUR MILLING

A fair quantity of American slack gum shooks are used by the British milling industry to make export containers for flour. The staves are 28½ inches long and knife-cut five staves to $1\frac{15}{16}$ inches in thickness. Jointed gum heading is also used for the barrels 17 and 17¼ inches diameter by ½ inch thick. The grading rules of the Associated Cooperage Industries of America govern sales of this stock in Great Britain.

PACKING-HOUSE PRODUCTS

Most of the packing-house products consumed in Great Britain are imported, so that there are large numbers of secondhand barrels always obtainable. The United States supplies large quantities of these products, and a small quantity of white oak tight shooks 30 inches long (half-barrel size) is imported for export packing of pickled meat.

SMALL COOPERAGE

Staves to manufacture dolly and other tubs, churns, water breakers, vinegar barrels, and other small containers are used in Great Britain. Except for vinegar barrels and churns, they may be either red or white oak, 18, 20, 22, and 24 inches long by 3 inches and wider by ⅝ and ¾ of an inch thick, and are imported from America, circle sawn, jointed or unjointed, either rough or planed, ready for making into the barrel.

Staves 18 by 20 and 24 by ¾ inch are used for vinegar barrels, but in wine quality, free from sap, and they must be white oak. Russian and Polish oak is also used, the staves being cut out of seconds from brewery stock.

Quantities of imported heading are used applicable to the staves, but heading is also made by the coopers themselves out of flat material.

DISTILLING

Glasgow and Leith are the chief centers for the manufacture of casks for the British distilling industry, and American white oak is used exclusively for whisky barrels. On account of the high rate of duty there is a smaller consumption of whisky in Great Britain than formerly, but the export trade in casks is considerable, and large numbers of staves and heading pieces are used annually for this trade. The demand from certain export markets seems to tend toward whisky in cases in preference to casks.

In addition to the barrels used for transportation, the distilling industry imports from Spain large numbers of empty barrels that have formerly been used as containers of sherry for maturing. According to British Government regulations, whisky must be matured for 3 years before being sold, but some distillers hold their product for even 10 years before putting it on the market, so that the turnover is slow and the number of casks held in bond is largely increased on that account.

Prime flat-bucked and circle-dressed American white-oak split staves in the following dimensions are used for the manufacture of whisky barrels: 1, 1⅛, and 1¼ by 34 to 38 inches; 1, 1⅛, 1¼, and 1½ by 38 to 40 inches; 1, 1¼, 1½, and 1⅝ by 44 inches; 4½ inches average basis inside the sap.

Some white oak oval-dressed French clarets 36 inches and 42 to 47 French inches long are also used. (The French inch is equal to 1.06 American.)

Formerly staves 26 by ¾ inch, known as an octave stave, were used, but have been discontinued, also the ordinary quarter-cask stave, 1 by 1⅛ by 34 to 38 inches long, is not used to any extent; in fact, they have seldom been called for in recent years. The principal sizes asked for to-day for whisky barrels are 1¼ and 1½ by 38 to 40 inches long, 1¼ and 1½ by 44 inches long, and 36 to 42 inch French oval clarets, the former being chiefly used.

The sawn heading used is also of American white oak and is imported in the following dimensions:

32 inches diameter by 1⅛ inches thick.
20 to 22 inches diameter by 1¼ inches thick.
20 to 24 inches diameter by 1¼ inches thick.
24 to 26 inches diameter by 1¼ inches thick.
26 to 28 inches diameter by 1¼ inches thick.
28 to 30 inches diameter by 1¼ inches thick.
32 to 33 inches diameter by 1¼ inches thick.
24 inches diameter by 1½ inches thick.
26 to 27 inches diameter by 1½ inches thick.
28 to 30 inches diameter by 1½ inches thick.
32 to 33 inches diameter by ½ inch thick.
33 inches diameter by 1⅜ inches thick.
6 inches average basis.

It is of the greatest importance that staves and heading should be thoroughly seasoned before shipment, otherwise buyers may refuse to take delivery. Some time ago a parcel of green staves arrived at Glasgow that had to be put in store for seasoning. As it takes considerably longer to season staves in Scotland than in America, heavy charges accrued before the buyers would accept delivery.

The principal defects in whisky staves are sap and "cat faces." Whisky is stored and matured in casks for a number of years; and if there is any sap on the staves, it is liable to rot and a leakage ensue. Again, "cat faces" permit leakage after a time, so that the barrels have to be patched to prevent loss of the contents.

DRY CHEMICALS

Soda ash, refined bicarbonate of soda, muriate of ammonia, and soda crystals are the principal dry chemicals packed in barrels, the same kind of containers being used in both the domestic and export trades. Mixed north European pine and spruce (known as "fir" in the trade), imported from Finland, Sweden, and to some small extent from Russia, are most commonly used. The staves are flat sawn, the usual sizes being 42 by ⅝ inch, 2½ to 5 inches wide, and 30, 32, 34, 36, and 42 by ½ inch, 2 to 5 inches wide, not over 10 per cent 2 inches. The heading varies from 30 inches diameter by ¾ inch to 22 by ⅝ inch, but little is imported, most being manufactured by the coopers out of lumber.

CHINA CLAY AND POTTERY

A considerable quantity of these "fir" staves is used in the manufacture of barrels for china clay. The county of Cornwall is the only section of Great Britain where this mineral is found, and large quantities are shipped to Staffordshire and Worcestershire for the pottery industry. This industry, however, consumes about one-third of the production, the remainder being exported.

The staves used to make china-clay containers are flat sawn and are imported from Finland and Sweden through the port of Fowey in Cornwall, the principal sizes being as follows: Hogsheads—staves (flat sawn), 41½ by $\frac{9}{16}$ inch, 2 to 5 inches wide; heading, 27 by ¾ inch, 4 to 9 inches wide; half cask—staves, 33 by $\frac{7}{16}$ inch, 2 to 5 inches wide; heading, 17 and 18 inches, 2 to 5 inches wide.

However, the quantity of wood containers now used for transporting china clay is small compared with pre-war times, as double bags of burlap have largely replaced them on account of their cheapness.

The pottery industry also uses north European fir staves for the manufacture of containers, the usual stave sizes being 34, 36, 38, 40, 42, and 44 by ½ inch; 40, 42, and 44 by ⅝ inch; and 30 by ⅜ inch, all 2 to 5 inches wide. Little heading is imported, it being made out of lumber in the cooperage plants.

THE COOPERAGE INDUSTRY

The manufacture of casks or barrels for holding liquids demands the greatest skill, because, in addition to being perfectly tight when filled with liquid, the vessels must bear the strain of transportation to great distances, stand rough handling, and in some cases must resist considerable internal pressure when they contain fermenting liquor.

Owing to the peculiar shape of a barrel—usually having its greatest diameter at the center—each stave must be properly curved to form a segment of the whole and must be so cut as to have a suitable bilge or increase in width from the ends to the middle; it must also have its edges beveled to an angle that will form tight joints. Machinery of an elaborate character has been devised to perform most of the operations of making both tight and slack barrels and has to a great extent superseded hand labor.

EARLY ORIGIN OF THE INDUSTRY

The cooperage industry is one of the oldest in the United Kingdom, and the London Worshipful Company of Coopers was known as far back as 1307. In 1396 there is recorded a grievance to the company that barrels which had originally contained oil and soap were being used for wine and ale.

As far back as 1407 the mayor and aldermen of London ordained that "no one of the Mystery of Coopers" should make any vessels in which any liquor ought to be put unless of entire wood. Accuracy of manufacture and species of wood used in the manufacture of casks and barrels were also considered of prime importance, and in 1413 mention is made that barrels which were deficient of measure or made of improper wood or of bad workmanship were burnt, and in 1441 a cooper was fined 8d. for making defective casks.

In 1457 the mayor and aldermen of London passed another ordinance "that all vessels of unclean and sappy timber or lacking their just measure should be burnt."

Although many brewers in the United Kingdom make their own barrels to-day, this was not always the case, as by an act of Parliament passed during the reign of Henry VIII (1491–1547) brewers were prevented from making them and the business was given entirely to the members of the Coopers' Company.

The importance of a "trade-mark" was early recognized by the English coopers, and in 1420 an ordinance was made in London "requiring each cooper to have his own mark or sign made of iron and mark all barrels or kilderkins to be made, a copy of which mark or figure to be entered on record at Guildhall."

CONSUMPTION OF WOOD CONTAINERS DECLINING

The use of wooden containers for malt and spirituous liquor is declining in the United Kingdom, principally on account of a smaller consumption of liquor, also the quicker turnover owing to new methods cutting down the period necessary for maturing and the practice of many retailers to replenish their requirements at frequent intervals rather than to carry large stocks; in some cases liquor is being delivered in tank wagons instead of barrels.

The increased use of metal tank wagons and storage tanks for lubricating oils and kerosene has materially reduced the number of wooden containers used by the oil industry.

PRODUCTION

According to the Census of Production, 1924, the selling value of the output of cooperage, excluding containers manufactured in plants operated by brewers and distillers, or others whose main business consists of products such as oil, cement, and chemicals, which are shipped or stored in barrels or casks, was £2,775,000.

The value of the output of cooperage firms in Great Britain during 1924 is shown in detail in the following statement:

Wet or tight cooperage:	
Machine-made casks and cases for breweries and distilleries	£483, 000
Handmade casks and cases for breweries and distilleries	136, 000
Herring pickle barrels	232, 000
Other casks	375, 000

Dry cooperage:	
Machine-made casks and kegs	£71, 000
Handmade casks and kegs	139, 000
"White" cooperage (churns, tubs, buckets, etc.)	79, 000
Vats, backs, and other wooden vessels for storage	55, 000
Casks, remade	841, 000
Other products	105, 000
Repair work	259, 000
Total value	2, 775, 000

Of the total value of the output, approximately 30 per cent was for remaking, and there was evidence in the returns made that these containers were mainly those used for oils, beer, and spirits.

BREWERS' AND DISTILLERS' OUTPUT

Brewers and distillers were requested to include in their returns relating to the output of liquors the value of casks and cases made in their workshops and not included in the value of the liquors sold. They were also asked to include the cost of repairs to casks. The values so returned in Great Britain amounted to £536,000 in 1924, and this sum forms an addition to the values shown in the statement previously given.

PERSONS EMPLOYED

The average number of persons employed during the year 1924 at the plants to which the foregoing statement of output relates was 4,646, of whom 4,057 were operators and 589 represented management, clerical, and technical staff.

MANUFACTURE BY CONSUMING INDUSTRIES

Many of the larger brewers in England operate their own cooperage plants, and it is estimated that 60 per cent at least of the new barrels made in England are manufactured by the brewers and distillers themselves. In Scotland, however, the proportion is probably less, about 40 per cent being a fair estimate. Many of the cement and dry-chemical manufacturers and some of the oil companies also make their own barrels. So far as new casks of all descriptions are concerned, an increasing number—in fact, the larger proportion—are machinemade, leaving remaking (cutting down large casks into smaller ones) and repair work to be done by hand.

The pickled-herring industry occupies a rather peculiar position among those industries consuming large quantities of barrels, owing to its seasonal character, so that in order to enable the crews to make a livelihood during the offseason, they are employed making barrels. As the curers both operate the fishing boats and manufacture the barrels, this is a convenient way to insure having crews during the fishing season; otherwise they might drift to other sections of the country and it might be difficult to replace them.

TRADE ORGANIZATIONS

The British cooperage industry to-day is well organized, both employers and employees. The organization representing the former is the National Federation of Employers of Coopers in the United Kingdom and has its headquarters in London. Over 90 per cent of the master coopers in the United Kingdom belong to this federation, the membership of which numbered upward of 350 individual firms in March, 1926.

The affairs of the federation are governed by an executive council, which is composed of representatives nominated by the district associations located in the various sections of the country as follows: London, Midlands, Lancashire and Cheshire, northeast England and Yorkshire, west of England and Wales, south and west Scotland, and east and north Scotland.

The principal objects of the federation are to maintain industrial peace, handle matters affecting the relations between the employers and the coopers' union, and any others of importance to the cooperage industry as a whole.

OPERATIVES' UNION

The operatives' union is known as the Coopers' Federation of Great Britain and Ireland, which also has its headquarters in London. With the exception of those employed in the pickled-herring industry, virtually all of the coopers employed in Great Britain are members of this union, and at the latter part of 1926 these numbered approximately 6,800. Owing to the peculiar position occupied by the makers of herring barrels, they do not come under the wage agreements of the National Joint Industrial Council of the cooperage industry.

The wage scale paid in the British cooperage industry varies according to the kind of barrels made and the section of the country in which the work is done.

JOINT INDUSTRIAL COUNCIL

The principal function of the Joint Industrial Council, which is a body consisting of an equal number of employers and employees (12 of each) appointed by their respective trade organizations, is to secure the largest possible measure of joint action between employers and workpeople for the development of the industry as a part of national life and for the improvement of the conditions of all engaged in the industry. Any matter that falls within the scope of this general definition may be acted upon by the council.

Among its more specific objects are the following:

Regular consideration of wages, hours, and working conditions in the industry as a whole.

The consideration of measures for regularizing production and employment.

The consideration of the existing machinery for the settlement of differences between different parties and sections in the industry and the establishment of machinery for this purpose where it does not already exist, with the object of securing the speedy settlement of difficulties.

The consideration of measures for securing the inclusion of all employers and workpeople in their respective associations.

The collection of statistics and information on matters appertaining to the industry.

The encouragement of the study of processes and design and of research, with a view to perfecting the products of the industry.

The provision of facilities for the full consideration and utilization of invention and any improvement in machinery or method, and for the adequate safeguarding of the rights of the designers of such improvements, and to secure that such improvements in method or invention shall give to each party an equitable share of the benefits financially or otherwise arising therefrom.

Inquiries into special problems of the industry, including the comparative study of the organization and methods of the industry in this and other countries, and, where desirable, the publication of reports, the arrangement of lectures, and the holding of conferences on subjects of general interest to the industry.

The improvement of the health conditions obtaining in the industry and the provision of special treatment where necessary for workers in the industry.

The supervision of entry into, and training for, the industry, and cooperation with the educational authorities in arranging education in all its branches for the industry.

The issue to the press of authoritative statements upon matters affecting the industry of general interest to the community.

Representation of the needs and opinions of the industry to the government, government departments, and other authorities.

The consideration of any other matters that may be referred to it by the government or any government department.

The consideration of the proposals for district councils and works committees put forward in the Whitley report, having regard in each case to any such organizations as may already be in existence.

Cooperation with the joint industrial councils for other industries to deal with problems of common interest.

In addition to the National Joint Industrial Council, there are district councils located in the same sections of the country as the local associations of the employers' federations. There are seven in all and they cover the entire United Kingdom. The main functions of these district councils are as follows:

The consideration of any matters that may be referred to them by theNational Joint Industrial Council, and executive action within their district in connection with decisions arrived at and matters deputed to them by the National Council.

To make recommendations to the National Joint Industrial Council on any matters affecting the well-being of the industry as a whole.

To take executive action within their respective districts in connection with matters of purely local interest, including matters referred to them by works committees, subject to the right of the National Council to require notice of all decisions and within 10 days to veto any such action if it be found to involve the interests of other districts. The secretaries of the National Council shall communicate to the district councils within seven days from the receipt of the minutes as to whether in the opinion of the officers of the National Council such action is likely to involve the interests of other districts, and a final decision must be made by the National Council within a further 28 days. If the National Council do not excercise their right to veto any particular action of the district councils, such decisions shall come into operation retrospectively from the date of the decision by the district councils.

Cooperation with the district councils for other industries to deal with problems of common interest.

Where no adequate machinery exists for the settlement of differences between parties and sections of the industry, such differences as can not be settled within an individual factory or workshop shall be referred to the district council, and, failing a settlement by the district council, such differences shall be referred to the National Council.

Like the national councils, both employers and employees are equally represented on the district councils.

As a result of the efforts of the National Joint Industrial Council, an agreement stabilizing wages throughout the cooperage industry was made in 1925, and both sides have worked in harmony since that time.

OUTLOOK FOR AMERICAN STAVES

The brewing industry is the most important consumer of staves in the United Kingdom, it being estimated that approximately 50 per cent in value of the total imports are used by it. Although during the war American oak staves were imported for the manufacture of beer barrels, owing to the impossibility of getting the "Memel," just as soon as these were again available the industry returned to them. In spite of great efforts made since the armistice to induce the breweries to use American oak staves, they have not met with the slightest success, and it is the consensus of opinion that so long as the "Memel" product is available it will continue to be used by the brewing industry.

American oak, however, is preferred over all other by the distilling and palm-oil industries, and this business will doubtless be retained, although there is considerable competition in the latter trade from secondhand shooks. These industries, together with the oil (palm, kerosene, and edible) and keg trade, form a group second in importance to brewing in the United Kingdom stave trade.

Next in importance are those industries using containers made from north European pine and spruce—namely, the cement, herring, dry-chemical, and china-clay industries. Owing to the close proximity of the countries supplying these staves, they can be delivered at prices with which America has not so far been able to compete, and although efforts have been made to introduce the Douglas fir stave for the manufacture of cement barrels it was not found economically possible.

Of the minor stave-consuming industries the glucose and flour are the most important, and both use containers made out of American gum.

COMPLAINTS

There are few complaints made against American staves by the British importers, and it would seem that the export trade is in competent hands. Occasionally, it is said gum staves arrive discolored, which may be caused either by lack of protection from the weather during transit from the mill to seaboard or improper stowage on the vessel. On the whole, however, the British stave trade is well satisfied with the stock received from the United States

PROSPECT OF EXPANSION

The increased use of American staves, as limited to the manufacture of containers for specific commodities, is determined by the state of trade in those particular industries. When business is good the demand increases, while, on the other hand, depression is immediately reflected in the stave market. There are, however, some factors that are working toward a decrease in the total quantity of returnable barrels used, the principal of which is the great advance of motor transportation in Great Britain. Prior to the advent of the motor truck, commodities shipped in barrels, even when destined for near-by towns, had to be hauled in many instances by horse-drawn wagon to a railroad freight station, loaded on cars, and again hauled by wagon from the station at destination to the consumers' place of business. As a result of this procedure, several days necessarily elapsed while the barrels were in transit and the same loss in time took place during the return of the empties. As a consequence there were always large numbers of barrels in transit. The advent of the motor truck has changed all this and the railroads are now used only for long hauls. Trucks deliver over long distances, taking the full barrels out in the morning and picking up the empties en route, and return the same night. The retail trade is also relieved of carrying stocks, as fresh supplies can be delivered by truck the day following the order. Accordingly, where formerly an allowance of several days was made between the placing of an order and delivery, business is now done on practically a day-to-day basis, so that the turnover of barrels is much greater than when slower methods of transportation were used.

Another important factor tending toward a reduction in the number of barrels used is the shortening of the time taken for maturing of spirits, owing to the perfecting of new methods. Under the old system large quantities were stored for long periods, but as a result of the new methods the turnover of spirits has been considerably accelerated and fewer barrels are required for maturing than formerly.

It is also said in the trade that whisky for export is being shipped in cases more than formerly, and this practice also has its effect on the stave trade.

Again, in some instances, liquor is delivered to the retailer direct in tank wagons instead of in barrels as in the past. The growing use of motor tank wagons and the substitution of metal storage tanks is adversely affecting the use of barrels in the kerosene trade. Retail stores, to an increasing extent, are discarding the wood barrel and replacing it with metal tanks.

The use of gum flour barrels is limited to ship's stores, and it is probable that, were it not for the British Board of Trade regulation requiring flour on ships to be packed in wooden barrels, this trade would be lost. The business is comparatively small and no great expansion can be anticipated, but consumption is likely to remain around present levels.

USE OF SUBSTITUTES

The use of substitutes for wood barrels is making little headway in this market, except in the dry-chemical and, to a smaller degree, the china-clay industries, which are using burlap bags to a greater extent. There are many reasons for the use of wood barrels, such as convenience of handling, strength, comparatively low cost, and maturing properties, and long years of use have shown it to be a very satisfactory container for many commodities. It would be difficult to induce manufacturers of such goods to use containers made out of other material.

CONCLUSION

American staves are being used in the United Kingdom for the manufacture of containers for which experience has shown them particularly suitable, and the demand will naturally fluctuate in accordance with the prosperity or depression in the particular industries using them. It is, however, also true that there are small prospects of their being used to make containers for other industries, either on account of preference, as in the brewing industry, or cost, as, for instance, the north European softwood stave. In view, therefore, of the changes in transportation, maturing methods, or other factors, any increase in the use of American staves is considered in the trade as improbable in the future, but so long as barrels are needed for whisky, oil, and other commodities, there will always be a demand for the American product.

SHIPBUILDING

As the foremost shipbuilding country of the world, the United Kingdom is of particular importance to American lumber exporters for the reason that upon the activity in that industry depends, to a large extent, the demand for several American woods.

In 1914 the tonnage of steam and motor vessels of 100 tons and over in the world, according to Lloyd's Register of Shipping, was 45,404,000, of which 18,892,000 tons or 41.6 per cent, was owned in Great Britain and Ireland. In spite of the losses caused by submarine warfare, the total had risen to 63,267,000 tons by July 1, 1927, of which 19,179,000 were British owned, but on account of the great increase in building which had taken place during that period in other countries the percentage had shrunk to 30.3.

The banner year for British shipyards was 1920, when 618 vessels, having a gross tonnage of 2,055,624, were launched. The boom of 1920, however, was short-lived, and it speedily became evident that the supply of ships was greater than the world's carrying needs. Values steadily declined and a slump in shipbuilding set in which continued until 1926, when the total launchings in the United Kingdom had fallen to 197 vessels of 639,568 gross tons, the smallest volume recorded since 1893, with the exception of 1916.

In May, 1926, however, the coal miners of the United Kingdom went on strike, and by the end of that year the demand for tonnage to carry coal to that country was so great that a marked advance in freight rates took place. Large profits were made which, in many instances, were utilized to replace old tonnage which, under mormal conditions, could not compete with newer and more economically built vessels in the world's markets.

With the termination of the coal dispute in November, 1926, conditions in the shipbuilding industry began to improve but, while a good many orders were placed during the latter part of 1926, the actual construction was not begun until 1927, owing to the difficulty of obtaining steel plates caused by the closing down of blast furnaces through shortage of fuel.

This improvement continued as 1927 progressed so that, for the quarter ended September 30, vessels under construction numbered 327, having a total tonnage of 1,536,416, the highest total since September, 1922, and almost half the total world tonnage under construction.

LOCATION OF PRINCIPAL SHIPYARDS

According to the 1927–28 edition of Lloyd's Register of Shipping there are 225 shipyards in the United Kingdom, the principal ones being located in the following districts:

	Yards
Clyde (Glasgow, Greenock, etc.)	38
Tyne (Newcastle, Blyth, Jarrow, Hebburn, South Shields, North Shields, Gateshead)	17
Humber (Hull, Grimsby, Goole)	15
Thames (Millwall, Deptford, Rochester, Greenwich)	14
Sunderland	13
Liverpool and district (Birkenhead, Chester, Garston, Ellesmere Port, Lancaster, Northwich, Fleetwood)	13
Southampton	11
Tees district (Middlesborough, Stockton, West Hartlepool)	8
Aberdeen and district	9
Leith and district	7
Cardiff	5
Cowes, Isle of Wight	4
Belfast	2

The importance of the districts, however, must not be judged by the number of yards; as an instance, although only two are shown in Belfast, they are very large and of great importance in the shipbuilding industry. On the other hand, the Humber, Aberdeen, and Leith yards are largely engaged with fishing vessels and the Thames with barges, while Southampton and Cowes yards specialize in yachts.

QUANTITY USED IN STANDARD CONSTRUCTION

According to a leading British firm of shipbuilders, the following are the approximate quantities of wood used in vessels of standard construction under Lloyd's highest rating:

15,000-ton passenger vessel:
  300,000 feet, board measure, hardwoods.
  600,000 feet, board measure, softwoods.
  100,000 feet, superficial, plywoods.
10,000-ton cargo boat:
  24,000 feet, board measure, hardwoods.
  120,000 feet, board measure, softwoods.
10,000-ton tanker:
  12,000 feet, board measure, hardwoods.
  24,000 feet, board measure, softwoods.

PRINCIPAL USES

The principal uses for wood in shipbuilding are for shoring, staging and slipway, launching cradles and shores, decking, interior fittings and finish, deck houses, accommodation ladders, rails, bulkheading and cabin linings, hatch covers, bunker and hold ceilings, hold battens, pipe casing, topmasts and derrick booms, also for lifeboats. The woods used for interior fittings and finish of passenger boats naturally vary considerably, some being much more luxurious than others, and even in cargo boats there are many different woods used, some owners, especially those who carry their own insurance, requiring the best material, while with others price is the first consideration. The woods mentioned, however, in the following sections are those most generally used by the shipbuilders in the United Kingdom.

SHORING, STAGING, AND SLIPWAY

Large quantities of lumber are used for these purposes during the building of a vessel. Native larch is preferred for shoring poles but these are not always available, in which case Norway pine poles are used instead and even steel poles are sometimes used. These poles run from 60 to 70 feet long, about 16 inches diameter at butt with a 6 to 7 inch top. They are used to support the staging on which the men stand when working on the hull and frame. Experiments have been made with Douglas fir poles with satisfactory results and it would seem as if there was an opportunity to develop this business.

For staging White Sea spruce is used whenever possible on account of its lightness combined with strength. Staging is usually made by laying two pieces of 3 by 11 inch planks side by side. The shoring poles that support them are usually from 22 to 24 feet apart. Four men on an average work on each stage, the height varying from a few feet to 60 feet from the ground. North European spruce or even central European stock is used when White Sea is not obtainable, but they are avoided whenever possible.

Foundations and keel blocks may be either of wood or concrete and when of the former are usually of southern pine square sawn timber, and when concrete are capped with the same wood. When steel shoring poles are used they rest on a concrete foundation, while wooden ones rest on a small wood plate.

Cradles for launching purposes also require considerable quantities of wood, southern pine being mostly used.

DECKING

The principal woods used for decking are teak, southern pine, Douglas fir, and white pine.

The following is the decking bill for a 10,500-ton passenger steamer recently placed on the Clyde. For the exposed decks teak only will be used, southern pine for some covered decks, while others are to be of composition.

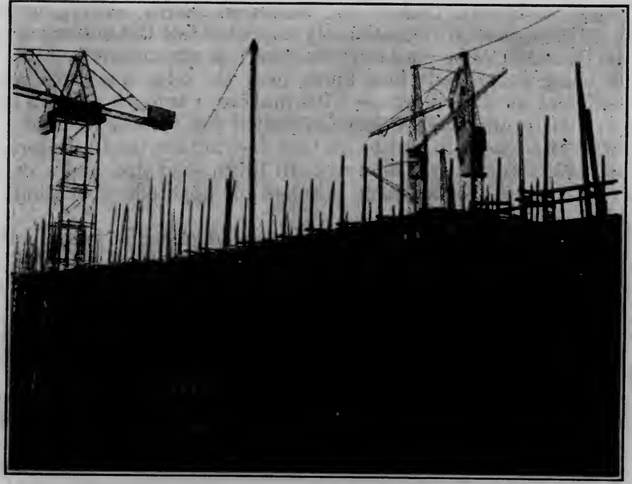


FIG. 34.—Clyde shipyard. Note great quantity of shoring poles, and staging used

TEAK

Top of deck houses, bridges, and boat decks: 52,300 linear feet 2¼ by 5 inches, 16 feet and up, 20 to 21 lineal average.

Bridge deck: 11,400 linear feet 2½ by 6 inches, 16 feet and up, 20 to 21 lineal average.

Margins: 2,560 linear feet 2¼ by 9 inches, 720 linear feet 2½ by 9 inches, 825 linear feet 3 by 9 inches, all 14 feet and up, 18 lineal average.

SOUTHERN PINE

Covered decks: 17,500 linear feet 3 by 6 inches, 18 feet and up, average 26 feet (this size is unusual, but was called for in this particular instance).

Teak is used exclusively for the exposed decks of passenger vessels engaged in the tropical and far eastern trade on account of its resistance to the depredations of the white ant and its ability to retain its shape without working or shrinking, after proper seasoning, under

The importance of the districts, however, must not be judged by the number of yards; as an instance, although only two are shown in Belfast, they are very large and of great importance in the shipbuilding industry. On the other hand, the Humber, Aberdeen, and Leith yards are largely engaged with fishing vessels and the Thames with barges, while Southampton and Cowes yards specialize in yachts.

QUANTITY USED IN STANDARD CONSTRUCTION

According to a leading British firm of shipbuilders, the following are the approximate quantities of wood used in vessels of standard construction under Lloyd's highest rating:

15,000-ton passenger vessel:
  300,000 feet, board measure, hardwoods.
  600,000 feet, board measure, softwoods.
  100,000 feet, superficial, plywoods.
10,000-ton cargo boat:
  24,000 feet, board measure, hardwoods.
  120,000 feet, board measure, softwoods.
10,000-ton tanker:
  12,000 feet, board measure, hardwoods.
  24,000 feet, board measure, softwoods.

PRINCIPAL USES

The principal uses for wood in shipbuilding are for shoring, staging and slipway, launching cradles and shores, decking, interior fittings and finish, deck houses, accommodation ladders, rails, bulkheading and cabin linings, hatch covers, bunker and hold ceilings, hold battens, pipe casing, topmasts and derrick booms, also for lifeboats. The woods used for interior fittings and finish of passenger boats naturally vary considerably, some being much more luxurious than others, and even in cargo boats there are many different woods used, some owners, especially those who carry their own insurance, requiring the best material, while with others price is the first consideration. The woods mentioned, however, in the following sections are those most generally used by the shipbuilders in the United Kingdom.

SHORING, STAGING, AND SLIPWAY

Large quantities of lumber are used for these purposes during the building of a vessel. Native larch is preferred for shoring poles but these are not always available, in which case Norway pine poles are used instead and even steel poles are sometimes used. These poles run from 60 to 70 feet long, about 16 inches diameter at butt with a 6 to 7 inch top. They are used to support the staging on which the men stand when working on the hull and frame. Experiments have been made with Douglas fir poles with satisfactory results and it would seem as if there was an opportunity to develop this business.

For staging White Sea spruce is used whenever possible on account of its lightness combined with strength. Staging is usually made by laying two pieces of 3 by 11 inch planks side by side. The shoring poles that support them are usually from 22 to 24 feet apart. Four men on an average work on each stage, the height varying from a few feet to 60 feet from the ground. North European spruce or even central European stock is used when White Sea is not obtainable, but they are avoided whenever possible.

Foundations and keel blocks may be either of wood or concrete and when of the former are usually of southern pine square sawn timber, and when concrete are capped with the same wood. When steel shoring poles are used they rest on a concrete foundation, while wooden ones rest on a small wood plate.

Cradles for launching purposes also require considerable quantities of wood, southern pine being mostly used.

DECKING

The principal woods used for decking are teak, southern pine, Douglas fir, and white pine.

The following is the decking bill for a 10,500-ton passenger steamer recently placed on the Clyde. For the exposed decks teak only will be used, southern pine for some covered decks, while others are to be of composition.

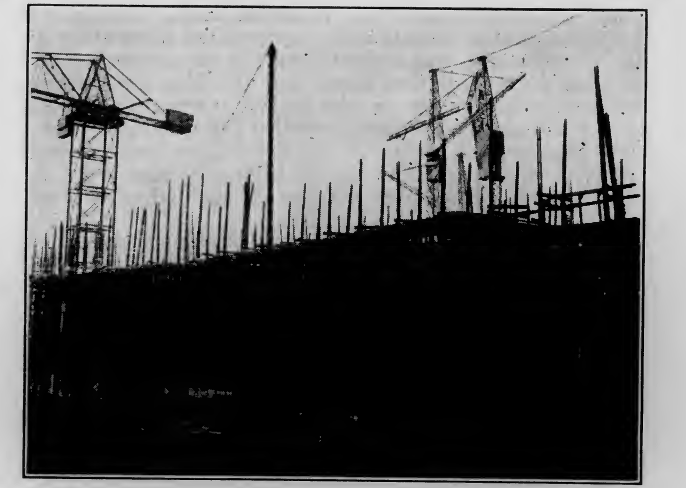


FIG. 34.—Clyde shipyard. Note great quantity of shoring poles, and staging used

TEAK

Top of deck houses, bridges, and boat decks: 52,300 linear feet 2¼ by 5 inches, 16 feet and up, 20 to 21 lineal average.

Bridge deck: 11,400 linear feet 2½ by 6 inches, 16 feet and up, 20 to 21 lineal average.

Margins: 2,560 linear feet 2¼ by 9 inches, 720 linear feet 2½ by 9 inches, 825 linear feet 3 by 9 inches, all 14 feet and up, 18 lineal average.

SOUTHERN PINE

Covered decks: 17,500 linear feet 3 by 6 inches, 18 feet and up, average 26 feet (this size is unusual, but was called for in this particular instance).

Teak is used exclusively for the exposed decks of passenger vessels engaged in the tropical and far eastern trade on account of its resistance to the depredations of the white ant and its ability to retain its shape without working or shrinking, after proper seasoning, under tropical conditions. The decking is imported ready-made and some is manufactured in local sawmills out of timber. The principal specifications used are 2½ and 3 by 5 inches, 16 feet and longer, averaging about 20 to 21 feet, although other dimensions are sometimes called for. Specifications require the stock to be cut full so as to finish after dressing to the sizes given. Teak is also used for deck margins on these vessels—i. e., that part of the deck nearest the rail—around hatches and other places where the space is not sufficient to use two regular pieces but is too great for one piece. These margin planks, as they are called, are usually bought 2¼, 2½, and 3 by 9 inches wide, 14 feet and longer, averaging 18 feet.

Southern pine has for many years been popular with British shipbuilders and there is probably more of this species used than any other. It is usually imported rough sawn to decking sizes, chiefly 3 by 5 inches and 2½ by 5 inches, 18 feet and longer in length, averaging 24 to 26 feet. Other sizes are occasionally imported but the volume is comparatively small. The grade of "decking" is exceptionally high, few defects being permitted; face knots near the edge are considered a serious defect as they interfere with making a smooth calking seam. All-heart flat-grain stock is usually called for although some small quantities of edge-grain and heart-face decking are used. Before laying the deck planks are planed smooth to finished size, and a calking seam one-sixteenth of an inch is taken off both edges one-half the thickness of the piece.

In Scotland and northern Ireland some decking is manufactured from large sawn timber imported as 35 or 40 cubic average, 12 by 12 inches and up, 16 feet long and up. Some 3 and 4 by 11 inches and wider "extra prime" lumber is also used for margin planks.

Douglas fir, called Columbian or Oregon pine, is making considerable headway for decking. The moderate price at which edge-grain stock (which is mostly used in this species) can be delivered in the United Kingdom, compared with others, is proving an important factor in its favor; so important, indeed, that the use of Douglas fir decking seems likely to increase to the detriment of other woods. It is imported in the same dimensions as southern pine with a slightly longer lineal average, 28 to 30 feet being usually called for.

Until recently Douglas fir has not been used in British battleships either for decking or armor backing, but it is of interest to note that H. M. S. *Rodney*, 35,000 tons displacement, launched at Birkenhead in December, 1925, had decking of this wood and it is reported that the British Admiralty has decided to use Douglas fir for other ships also.

It is reasonable to assume that the "Buy Empire goods" campaign has had some effect in bringing about this change. Inasmuch as Admiralty contracts specify that preference will be given to bidders offering stock to be shipped from British Columbia, it is doubtful if the United States will directly benefit by this decision. It is, however, a striking compliment to Douglas fir and the example of the British Admiralty will doubtless influence those shipowners who heretofore have not considered this wood suitable for decking, and it is from these that United States Pacific coast lumber exporters are likely to benefit.

White pine, or, as it is called in Great Britain, "Quebec yellow pine," has for many years been a favorite decking wood, but owing to its softness making it unsuitable where it is subject to heavy wear its use has been largely confined to yachts, high-class small craft, and the bridge and promenade decks of first-class passenger liners.

Another use is for decking of cross-channel and excursion steamers and other vessels of large passenger capacity but of light draft. The weight of the decking on vessels of this character is an important factor, the difference, according to a prominent shipbuilder, being as many as 70 persons between this and other species.

Its freedom from pitch and color make it especially desirable for decking where appearance and not utility is a prime consideration.

No manufactured white pine decking is imported into the United Kingdom, but decking is made from hewn timber known in the trade as "Quebec wany board pine." This timber is hewn on all four sides with a heavy wane on each corner. However, owing to the great value of this wood, its use for decking is becoming increasingly less year by year, and to-day only very small quantities are used for this purpose.

INTERIOR FINISH AND FITTINGS

Honduran and African mahogany, Austrian, Volhynian, and, to a small extent, American northern white oak, walnut, bird's-eye maple, and native sycamore are the principal woods used for panels and interior finish. In addition to these, small quantities of satinwood and many other fancy hardwoods are used. Much of this material is purchased ready-made in the form of panels, the figured or fancy woods being veneered on an inexpensive plywood such as okoumé (gabon), north European birch, and alder. For the frames of panels and pilasters American yellow poplar is a favorite wood on account of the ease with which it can be worked and the readiness with which it can be stained to resemble the panel wood.

Mahogany and oak are principally used for saloon and stateroom furniture; when of mahogany the Cuban variety is always used for the chairs as experience has shown it to be the only one that successfully stands up under the strain caused by the constant vibration of the vessel.

American yellow poplar is extensively used for the framework of wardrobes, chests, and sides and backs of drawers. For drawer bottoms and backing any cheap plywood is used, three-ply, $\frac{3}{16}$ inch thick, being mostly employed. Other species used for finishing work are Californian sugar and white pine and Canadian white pine.

Cabin doors require a large amount of lumber, these all being made in the shipyard's own shop. Port Orford cedar is making considerable headway for stiles and rails and Canadian white pine is also used for this purpose. The panels are mostly of okoumé (gabon) plywood ⅜ inch thick, three-ply. These doors are always painted white and it is essential that they be made from woods that will give a perfectly smooth finish. For that reason certain species have made little headway for this work although entirely suitable in every other respect.

In pre-war days stateroom and saloon decks were usually of wood but in recent times this material has almost entirely been superseded by composition flooring.

DECK HOUSES AND RAILS

Teak is used exclusively for the outside weather doors of companionways, officers' quarters, chart room, and wheelhouse, also for the accommodation ladder and deck rails; these latter being generally cut out of planks 2½ to 8 inches thick by 8 inches and wider, 16 to 20 feet long.

STATEROOM BULKHEADING AND LININGS

While Canadian white pine is still preferred, its cost is causing shipbuilders to seek less expensive material. In this respect, okoumé (gabon) plywood is being used to an increasing extent for stateroom bulkheading and lining. Five-eighths of an inch and 1 inch thick, in five or seven ply, are used for these purposes, cross-banded or multi-ply boards only being considered suitable, it being claimed that the cores of laminated boards will work loose under the strain of constant vibration of the vessel.

Douglas fir plywood, however, which is admirably suitable, has, after considerable effort, gained an opening and the prospects are favorable for its increased use for these purposes.

PANTRIES AND GALLEYS

On first-class passenger liners mahogany or oak is used for pantry furnishing, while Sitka spruce, Canadian white pine, or north European spruce are used for shelving. Galley furniture is largely made of teak, while for sinks Canadian birch, and European and Canadian spruce, covered with zinc, are used.

MASTS, BOOMS, AND YARDARMS

Southern pine and, to a small extent, Douglas fir are the principal woods used for topmasts, yardarms, and derrick booms. Most vessels nowadays, however, are using steel so that the demand for timber for these purposes is declining.

HOLD LINING, HATCH COVERS, ETC.

Large quantities of softwood lumber are required for the lining of holds, bunker ceilings, and pipe casing. No particular wood is used, Canadian spruce, north European pine and spruce, and native Scotch fir all being used indiscriminately. On the better-class cargo vessels, however, southern pine is frequently used because of its superior wearing qualities.

Considerably greater quantities of lumber are required for refrigerator than for ordinary cargo vessels. These, in addition to the ordinary lining which is used to protect the cargo from plate sweat, have an insulation lining and bottom, the intervening space between it and the regular lining being filled with cork or other insulating material. The hatch covers are also insulated in the same manner.

PROPELLER BUSHING

No wood has been found so far equal to lignum-vitæ for this purpose. It is imported chiefly from the Dominican Republic (the best variety), Bahama, and Jamaica.

LIFEBOATS

Lifeboats, which must be constructed according to specifications drawn up by the Board of Trade, are not usually built by the builders of the ship but are generally purchased by them from firms who make a specialty of their manufacture. The stem and sternposts are usually made of native oak, the wood being purchased in the log cut through and through and the shapes cut from planks so as to get the natural curve of the grain. Native oak is also largely used for deadwood, apron, and the thwarts, but where teak is used for planking the thwarts are of that wood also. Canadian rock elm is used mostly for the keel, framing, gunnel, stem and stern knees, and belt. This wood is imported mostly in the form of square hewn timber and cut into the sizes desired as required. Native larch is preferred for keelson and planking, but when the lifeboat is for a vessel destined to trade in the far eastern or tropical trade teak is substituted.

The lifeboats are fitted with ash oars imported ready-made from the United States and an oak water beaker purchased from local coopers.

SAILING VESSELS

The building of ocean-going sailing vessels has practically ceased in the United Kingdom.

BARGES

Although many of the canals have largely fallen into disuse in face of railroad and motor competition, there are still a great many barges in use. Especially in the port of London are they in evidence, much of the cargo arriving there being delivered overside into sail barges and transported by them direct to consignees located in the Thames estuary. The usual length of a Thames sail barge is 82 feet, breadth 18 feet 6 inches, depth 6 feet 6 inches, which enables them to navigate in comparatively shallow waters.

Native oak and elm are extensively used in the construction of these barges, elm for the keel and that part of the ends nearest the keel, and oak for the sternpost, stem, stern and stem knees, such part of the ends as are not of elm, floor joists, rudderpost, and leeboards.

The keelson is generally a piece of 14 by 14 inch Douglas fir, the same wood also being used for the bottom, while for the side keelsons and rudder southern pine is used.

North European pine 3 by 6 inches, painted both sides and calked, is used for the decking, while for the sheathing, which is diagonally set with tar and hair, 1-inch boards of the same wood is used.

As to the spars, the mast is generally southern pine while for the sprit, which is exceptionally long, some measuring as much as 56 feet, Douglas fir is usual, while Swedish or Norwegian pine is employed for the topmast, mizzenmast, and bowsprit.

MOTOR VEHICLES

The manufacture of automobiles, trucks, omnibuses, chars-à-bancs, and commercial vehicles is rapidly becoming one of Great Britain's major industries. To-day it probably ranks first among the engineering trades. Since the war, British producers have concentrated on increased output and a larger share, not only of the home market, but the foreign markets as well, particularly those of the Dominions.

The reimposition of the import duty of 33⅓ per cent on passenger cars in July, 1925, and on trucks in April, 1927, acted as a powerful stimulant and production has increased from 66,300 cars and 21,600 trucks in 1923, the first year for which separate figures are available, to approximately 158,600 cars and 50,000 trucks in 1926.

There are about 60 firms in the United Kingdom producing passenger cars and 50 producing commercial vehicles, and some produce both kinds. Excluding one outstanding company which has an annual output of more than 50,000 cars and trucks, the general output of individual factories varies from 1,000 to 2,000 cars per year in the luxury or high-grade class of cars to 8,000 and 10,000 cars per year for a few firms manufacturing medium-priced vehicles.

A marked feature of the British automobile industry is the extent to which bodies are built by firms solely engaged in that business owing to the British preference for cars of distinction or individuality. It is a common practice among persons owning high-grade cars to purchase the chassis from a manufacturer and have the body built to suit special requirements or ideas by a body-building firm. Many of these firms, before the advent of the motor-driven vehicle, were carriage builders and, as such, well qualified to undertake high-class coach work when changing times forced them to seek new avenues of business.

The motor-vehicle industry is a large consumer of wood and of considerable importance to the United States export trade because upon its prosperity depends almost entirely the British demand for American ash. During 1926 over 15,000,000 feet board measure of ash lumber were exported to the United Kingdom from the United States and, in addition, many thousand logs, practically all of which were for use in the manufacture of motor vehicles. Although experiments have been made with all-metal bodies by some manufacturers, little headway has been made and it is doubtful if there is any danger of wood being replaced to any appreciable extent for some time to come.

PASSENGER CARS

Framework.—By far the most important species entering into the manufacture of passenger cars is ash, which is used almost exclusively for framework. The United States, native, Irish Free State, and Polish varieties are all used but America furnishes by far the greater portion of the industry's requirements. During the past few years efforts have been made to introduce central European beech for body frames but with little success, ash easily retaining its unassailable position for this purpose. Hard maple was also used to some small extent but its use has now practically been discontinued.

Bodies.—Metal panels are used exclusively in passenger cars except for those having custom-built bodies, which frequently are most luxurious. Wooden panels are frequently used in these, mahogany being considered the best for this purpose. Most dash or instrument boards, as they are called, are now made of enameled metal, although mahogany, walnut, or yellow poplar stained to simulate these woods are also used. Oak was popular for this purpose some years ago but in recent times it has dropped out of favor.

Steering wheels are principally of composition and only in the more expensive cars are they of wood, in which case American black walnut is used.

Wood wheels are seldom used by British car manufacturers, disk, cast, or wire being preferred. However, when wood wheels are furnished, ash or hickory is used but the quantity consumed for this purpose is very small.

Various woods are used for running boards, among them being cypress and poplar, but little importance is attached to the variety as the boards are covered with metal.

In addition to these principal uses, small quantities of fancy woods for interior trim and European softwoods for floors are also used.

TRUCKS

Native ash is preferred for the runners and cross-bearers of trucks, it being claimed that this variety has more strength than any other. The use of native oak for these parts, also for the flooring, which naturally is subjected to very hard wear, is growing to a considerable extent.

For light commercial vehicles, the question of tax is an important sales factor. As this tax is graded according to the unladen weight of the truck, the kind of wood used has a bearing on it. For vehicles over 12 hundredweight (1,344 pounds) but not exceeding 1 long ton (2,240 pounds) the tax is £16 per annum, while for over 1 ton but not exceeding 2 tons it is £26. For this reason some manufacturers are using other species in place of ash in order to build a truck that will come within the minimum tax limit, and continental beech is the variety most commonly substituted.

While European softwoods are still largely used for the sides, there is an increased tendency toward ash, oak, magnolia, or other hardwoods.

Many trucks have a compartment or cab for the driver for the construction of which magnolia or poplar is largely used.

In addition to open trucks, large numbers of light commercial vans have covered tops. While plywood is being used to an increasing extent, most commercial vehicles at present have bent ash frames. These are either lined or unlined (when lined north European softwood is used) and covered with waterproofed fabric.

OMNIBUSES

As in trucks, native ash is used almost exclusively for the runners and cross-bearers of omnibuses. As the maximum length of American ash lumber is 16 feet and omnibus runners are 18 feet and longer, it is doubtful if the demand could be met from the log imports even if that variety were acceptable. The body frame, step treads and risers, and floors were are all of ash, the latter being made of short strips about ½ by 1 inch laid on a subfloor of north European softwood in corrugated form in order to drain off the water in rainy weather. Any small pieces left over from framework are utilized for this purpose.

Sitka spruce is principally used for the roofs, the large quantities of reject airplane material, which has been available during the last few years at a very moderate price, having been an important factor in encouraging its use for this purpose.

While there is a growing tendency toward the use of metal for inside panels, north European birch plywood is still generally used and, to a small extent, Japanese and Chinese ash.

Interior seats are placed crosswise in the omnibus with a center aisle and are generally upholstered, the frame being of ash with a birch plywood back. Exterior seats are placed similarly to the interior and are of the garden type. They are made of ash and painted to protect them from the weather, comparatively few omnibuses having covered tops at the present time although the practice is growing.

PURCHASES AND METHOD OF USE

British automobile manufacturers buy their ash requirements either in the form of logs cut through and through or as lumber on grade. This latter, however, is received only from the United States, first and seconds and No. 1 common and select grades in all thicknesses being used. Stock is imported green and stored for about nine months to season before being sold to the manufacturers. Other varieties used are purchased in the form of square-edged lumber only. On being received at the factory, the lumber is cut and bent into the sizes and patterns desired, which method largely eliminates waste and enables very close utilization of the lumber.

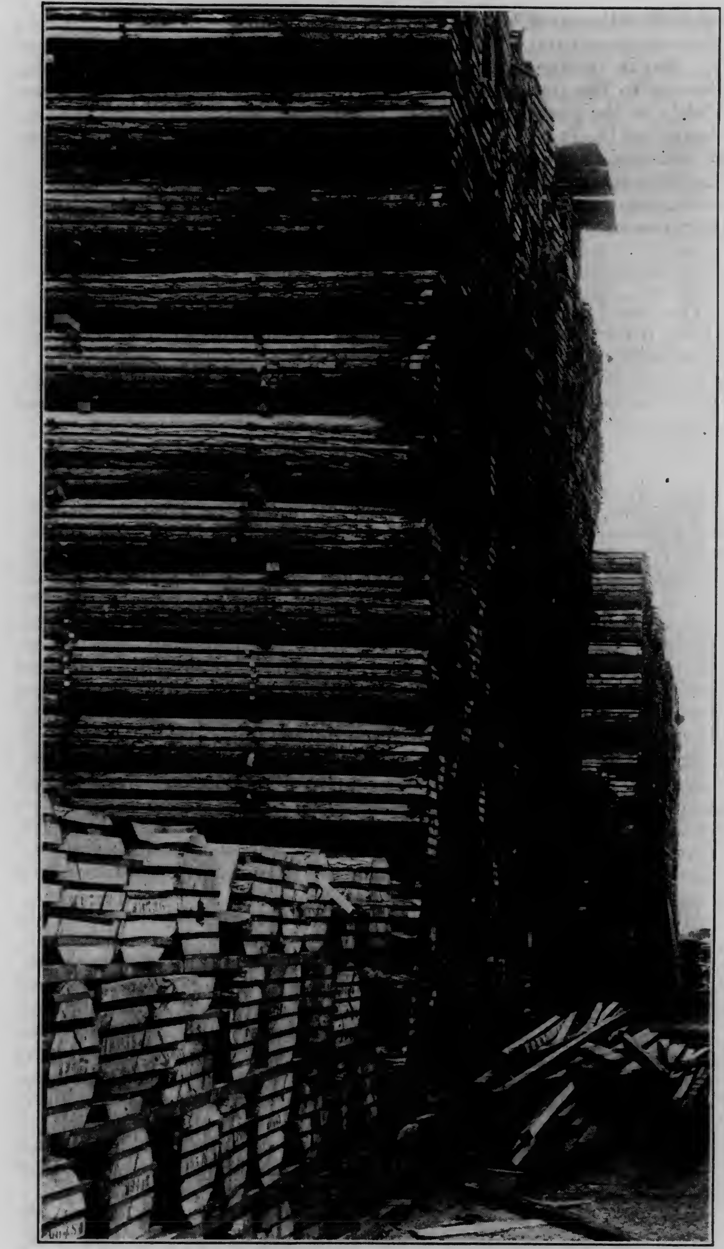
The manufacture of bent timber for motor bodies, however, is being successfully developed by firms who specialize in bending work and instead of doing this themselves many motor-vehicle manufacturers are now buying their bends ready-made. Bends are supplied to fit all the important curves in any pattern or specification for back lights, elbow and waist rails, back pillars, wheel arches, roof and cant rails, or other parts requiring bent wood. The fact that in bent timber the grain of the wood follows the curvature ensures, if the steaming and bending is properly done, that the bend, when dried, will retain its shape indefinitely. Another point in favor of its use is the elimination of joints, thus doing away with creaking, always an unpleasant possibility with jointed woodwork.

The fact that bending firms do not limit their business to the motor-vehicle trade but cater to all industries using bent timber enables them to utilize a much greater percentage of the lumber than is possible where the number of patterns and sizes is comparatively limited, as in a motor-vehicle plant making few types of bodies. For this reason, they can in many instances furnish bends at a lower price than the factories can make them themselves.

CRITICISM OF AMERICAN ASH

The principal complaint made against American ash is that of texture. Only firm-textured white ash is wanted and if any other kind is shipped trouble is sure to result. It is claimed by one British lumber importer, who caters largely to the automobile industry, that he frequently receives lumber with several feet at one end being soft textured and probably cut from the swell butt of the log, while the rest of the piece is tough and perfectly suitable for bending purposes. Shipments of this character cause much trouble and many claims would be avoided if the soft parts were trimmed off before shipment. Swell butts in logs are also disliked and any large percentage in a parcel will doubtless result in an allowance.

Worms are another cause of complaint and are most frequent toward the end of the log-shipping season. Only logs felled during the winter months, before the sap has begun to run, should ever be



Photograph by F. N. Birkett, London.

FIG. 35.—American ash logs cut and piled for seasoning

Interior seats are placed crosswise in the omnibus with a center aisle and are generally upholstered, the frame being of ash with a birch plywood back. Exterior seats are placed similarly to the interior and are of the garden type. They are made of ash and painted to protect them from the weather, comparatively few omnibuses having covered tops at the present time although the practice is growing.

PURCHASES AND METHOD OF USE

British automobile manufacturers buy their ash requirements either in the form of logs cut through and through or as lumber on grade. This latter, however, is received only from the United States, first and seconds and No. 1 common and select grades in all thicknesses being used. Stock is imported green and stored for about nine months to season before being sold to the manufacturers. Other varieties used are purchased in the form of square-edged lumber only. On being received at the factory, the lumber is cut and bent into the sizes and patterns desired, which method largely eliminates waste and enables very close utilization of the lumber.

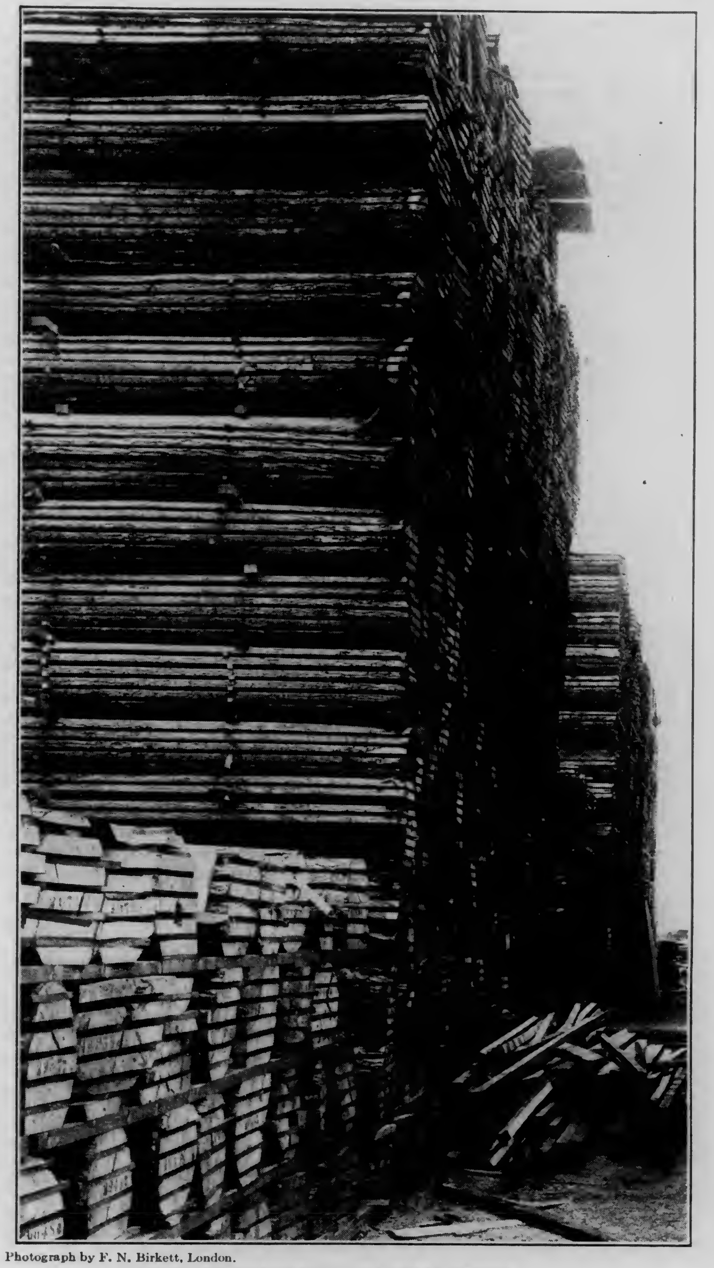
The manufacture of bent timber for motor bodies, however, is being successfully developed by firms who specialize in bending work and instead of doing this themselves many motor-vehicle manufacturers are now buying their bends ready-made. Bends are supplied to fit all the important curves in any pattern or specification for back lights, elbow and waist rails, back pillars, wheel arches, roof and cant rails, or other parts requiring bent wood. The fact that in bent timber the grain of the wood follows the curvature ensures, if the steaming and bending is properly done, that the bend, when dried, will retain its shape indefinitely. Another point in favor of its use is the elimination of joints, thus doing away with creaking, always an unpleasant possibility with jointed woodwork.

The fact that bending firms do not limit their business to the motor-vehicle trade but cater to all industries using bent timber enables them to utilize a much greater percentage of the lumber than is possible where the number of patterns and sizes is comparatively limited, as in a motor-vehicle plant making few types of bodies. For this reason, they can in many instances furnish bends at a lower price than the factories can make them themselves.

CRITICISM OF AMERICAN ASH

The principal complaint made against American ash is that of texture. Only firm-textured white ash is wanted and if any other kind is shipped trouble is sure to result. It is claimed by one British lumber importer, who caters largely to the automobile industry, that he frequently receives lumber with several feet at one end being soft textured and probably cut from the swell butt of the log, while the rest of the piece is tough and perfectly suitable for bending purposes. Shipments of this character cause much trouble and many claims would be avoided if the soft parts were trimmed off before shipment. Swell butts in logs are also disliked and any large percentage in a parcel will doubtless result in an allowance.

Worms are another cause of complaint and are most frequent toward the end of the log-shipping season. Only logs felled during the winter months, before the sap has begun to run, should ever be



Photograph by F. N. Birkett, London.

FIG. 35.—American ash logs cut and piled for seasoning

shipped, otherwise there is danger of worm damage, and a heavy claim or even total rejection is possible. Not only in logs, however, but also in lumber are worms frequently found and, apart from the damage to the particular stock itself, British importers fear the possibility of the pests spreading to other stock in the yard and for that reason are likely to take drastic action, even to the extent of refusing to take delivery if their presence is discovered on the dock. It is therefore essential that a careful watch be kept for worms and under no circumstances should stock having the slightest indication of their presence be shipped.

USE OF PLYWOOD

The use of plywood by the automobile industry is steadily growing. At the present time its chief uses are for interior panels and seats in omnibuses and tops of light commercial delivery vans. North European birch is principally used and to a small extent Japanese and Chinese ash, but a patent plywood having a metal face and back and a wood core is also being used.

FUTURE OUTLOOK

Not only for passenger cars but also for trucks, chars-à-bancs, and omnibuses is the outlook for increased production favorable and with it a greater demand for American ash may be anticipated. One of the noticeable features of British transport to-day is the extent to which chars-à-bancs and omnibuses are being used. Not only are they used for pleasure purposes, but in many instances they are directly competing with the railroads. Regular daily services are run between London and Bristol, Portsmouth and Brighton, and Liverpool and Glasgow, to give but a few illustrations, and to such an extent is their competition being felt that the principal railroad groups are now seeking permission to run motor-vehicle traffic parallel to their own roads—a privilege now denied them. Interurban omnibuses cover many sections of Great Britain and almost daily their services are spreading out in new directions. Again, the use of motor trucks is steadily increasing and heavy as well as light freight is now being delivered within a wide radius, and the delays of loading and unloading necessary in railroad traffic are thus avoided and much time is saved.

All these factors indicate that, apart from the export trade, the outlook for a steady increase in the production of motor vehicles is favorable, and as no wood has been found by the British manufacturers that compares with ash for framework, an increased demand from the United States for supplies can reasonably be anticipated.

Competitors of the United States, however, fully appreciate the importance of this industry and are not overlooking any opportunity to secure a greater share of its lumber requirements. Ash from Poland is well liked, its freedom from worms making it particularly desirable, and exporters in that country are making great efforts to increase their business. The "Buy Empire timber" campaign is also drawing attention to native ash, and many consumers are now paying more attention than formerly to this variety.

However, the United States will doubtless continue to supply the bulk of the ash requirements of the British motor-vehicle industry but more careful attention to texture and the avoidance of shipping wormy stock would not only make the business more profitable to the exporter but would prevent many claims—such causes of irritation and such disturbers of amicable business relations.

MILLWORK

The manufacture of window sash and frames, molding, interior trim and finish, doors, and staircases, or joinery, as it is called, is an important branch of the British lumber trade and gives employment to a large number of persons. There are many hundreds of these factories spread over the country, ranging from those having few employees and using little machinery (and much of that of primitive design), to first-class ones with a large number of employees, equipped throughout with up-to-date machinery.

The great activity in house building during the past few years has been a powerful stimulus to the millwork industry, which has enjoyed a period of prosperity unknown in pre-war days.

PRINCIPAL WOODS USED

Pine (redwood) from the White Sea and to a lesser extent from the Leningrad districts of Russia, the Gefle, Soderhamn, Hudiksvall, and Sundsvall districts of Sweden, and Douglas fir from the United States and British Columbia are the principal species used for millwork. The Russian wood, although more expensive, is preferred to the other species on account of its texture, evenness of grain, and the smooth flat finish that can be obtained, and as long as supplies are available it will furnish the bulk of the lumber used for high-class millwork in Great Britain. Douglas fir is the second choice for high-class work, its freedom from knots and defects, also the large sizes in which it can readily be obtained (little north European lumber being over 3 by 11 inches) being strong factors in its favor. Its use, however, will always be governed by the availability of Russian supplies, it being too expensive for ordinary purposes, but should imports from that country for any reason be curtailed, the demand for Douglas fir in the No. 2 clear and better grade would undoubtedly increase.

Swedish pine from the districts mentioned above is used exclusively for the millwork and interior trim used in the ordinary type of house and is much less expensive than either the Russian wood or Douglas fir. None of the pine grown in the other north or eastern European countries is suitable for millwork; the wood being in most cases coarse-grained and knotty it is used for building, box, and case-making purposes. The pine from the Finnish part of the Province of Karelia, however, is an exception. The wood from this Province, which lies partly in Finland and partly in Russia, is of a superior texture to pine from other districts of Finland and is readily accepted for remanufacturing.

Although pine lumber from the north European districts mentioned contains a considerable number of knots, these are small and tight and, as most of the interior woodwork in British dwelling houses is painted, they are not considered a serious defect. Of more importance in British eyes is the ability of a wood to take a perfectly smooth, flat finish, and this quality is possessed to a high degree by the pine grown in the Russian, Swedish, and Finnish districts mentioned above.

In addition to these, small quantities of north European spruce, or "whitewood" as it is called, are used.

Hardwood interior trim is seldom seen in Great Britain except in the homes of the wealthy and the quantity used for this purpose is of little importance to the lumber industry. Even where softwood is used, however, for general interior purposes, the newels and balustrade rails are usually of mahogany, and occasionally oak, in dimensions of 3 by 3 to 8 by 8 inches square, 8 to 16 feet long. The latter species is also used for window frames and sills to some extent, the American northern variety being preferred.

PURCHASE OF SUPPLIES

Most manufacturers of millwork lumber are also importers and purchase their requirements through agents, in this manner avoiding the importers' profit. While the lumber is seasoned before being shipped, it is seldom dry enough to be used on arrival and as few factories have kiln-drying facilities it is frequently held for as long as a year before use. As an outlet for undesirable sizes, British millwork factories are a valuable asset to the north European mills and at the end of the shipping season large accumulations of sizes in little demand are sold to Great Britain at, in many cases, bargain prices to prevent their being carried over to the next season.

TRADE ORGANIZATION

The millwork industry is well organized and has its own organization called the English Joinery Manufacturers' Association, with headquarters in Nottingham, to protect the interests of its members.

EQUIPMENT OF MILLS

The equipment of British millwork factories varies considerably both in number and kind of machines employed. There are still many hundreds employing few workers and using out-of-date equipment but the tendency during the past few years has been toward the concentration of this industry in the hands of large manufacturers with facilities for turning out any sort of work at short notice. Many of these plants have thoroughly up-to-date machinery, either modeled on American patterns or else imported from that country. The success of these methods has been such that, with the exception of standard doors and a small quantity of molding from Sweden, foreign-made millwork has practically ceased to be a factor in Great Britian and even the sales of imported molding have been severely curtailed.

In addition to the pendulum (swing) saw used to crosscut the rough lumber into stock lengths which is generally located just outside the mill proper, an average modern millwork factory will contain the following equipment, the number of machines naturally varying with the size of the plant.

Push saw bench.—As soon as the lumber, which has previously been cut to the required stock lengths, enters the mill proper, it passes to the push saw bench. This machine, generally fitted with a rising and falling table, consists of an ordinary circular plate saw, a 14 or 16 gauge being most common, although occasionally an 18 gauge may be used. On this machine the stock is resawn to the rough sizes required.

Planer.—The lumber then passes to the planing machine. In some of the smaller factories a combined planer and surfacer is used, but in the more up-to-date ones two separate machines are used, i. e., a hand-feed surfacer and the ordinary roller-feed single planer. It might be added that it is now compulsory in Great Britian for combined surfacing machines to be fitted with a circular safety cutter head, but in the majority of the roller-feed single surfacers the British machinery manufacturers still supply a square cutter block.

Molder or shaper.—After the planing operation the stock moves to the shaper or spindle molder, as it is called, or if in a large shop to the four cutters for molding. These machines in the average factory run at lower speeds than their American counterparts. In passing, it might be said that, owing to the individual methods and ideas of the average British architect, who insists on original patterns, it is not possible to get the production runs of similar plants in the United States.

Tenoning and mortising machines.—After the stock has been molded or shaped it passes to the tenoning machine, which generally is of the single-end type, somewhat similar to the average American machine of its kind although lacking the high-speed fitments generally embodied in the American tool.

If the stock has to be mortised it will go to a combined chain-and-chisel mortising machine, which is a tool like the combined planer peculiar to the British shops.

Sanding machines.—In some shops where sanding is done the material will now pass to the sanding machine, which may be of any one the following varieties: Hand-block belt sander, horizontal belt sander, or a column belt sander. In some of the large factories one may even find a roll-feed drum sander but these are not generally understood or appreciated at their true worth in the United Kingdom. However, a more lively interest is now being stimulated through the efforts of the representatives of American machinery houses.

The plant described may be considered as fairly representative, but there are many hundreds of small millwork factories which are without any four-cutters or sanding machine equipment. These rely on the shaper for their molding work and use cheap hand labor for sanding.

MANUFACTURED PRODUCTS

Window sash and frames.—The manufacture of window sash and frames is the most important branch of the British millwork industry. It might be thought that, in view of the great number of houses of a similar size that have been erected with the aid of the Government and municipal subsidies since the armistice, patterns and sizes of window sash and frames would have been standardized, but such is not the case. Uniformity in appearance is noticeable in the long rows of unsightly working-class dwellings built during the Victorian era, common in the industrial sections of Great Britain, and that is precisely what architects now strive to avoid and, as a consequence, designs and sizes are constantly changing and a great variety are used for the different types of dwellings that have been and still are being erected.

In view of this situation, the demand for any particular sash and frame can not be determined in advance but each job must be considered as a separate entity. As a result, the importation of ready-made stock has made little headway and it is very doubtful if it ever will as long as the building industry is organized as at present.

Interior trim.—Very few British houses have hardwood trim, most of them being finished in north European pine and painted to harmonize with the general color scheme. As a consequence, there is little demand for oak or other hardwoods used with a natural finish to such a great extent in the United States for this purpose.

Apart from the homes of the wealthy, wood paneling is seldom seen, the cost being too great for the ordinary dwelling house and it is in private offices, hotel bars, grills, smoking and reading rooms, libraries, and clubs that it usually seen. The moderate cost of plywood, however, and the efforts now being made by those interested in its sale to bring its advantages to the attention of the public for paneling may lead to an increase in its use for this purpose in the future, but for the many its costs will be prohibitive.

Molding.—Patterns have been largely standardized, the Swedish standard being generally used. While formerly large quantities of molding were imported ready-made from Sweden, the cost of production has been so reduced in Great Britain by mass-production methods and improved machinery that the Swedish exporters are finding it increasingly difficult to compete with the homemade product. As a result imports from that country have been materially reduced during the past few years and are now of comparatively small proportions.

Doors.—Great Britain has never been able to compete with the imported softwood stock door made principally in the United States, Sweden, and other European countries by mass-production methods. As a consequence, the manufacture of doors is almost exclusively confined to those of special design, made to architects' specifications, for banks, office buildings, hotels, and better-class residences, and are frequently of teak, oak, mahogany and, in many instances, veneered with figured or fancy hardwoods.

Kitchen dressers.—Practically all kitchens in British homes are fitted with a dresser for crockery and chinaware as a permanent part of their finish. These dressers have a low part consisting of two cupboards and two drawers and a top which may be either open or closed, lined with shelves for dishes. These shelves are faced with hooks on which are hung cups, pitchers, and other articles of crockery. Dressers are generally made of north European pine, except the table part which, on account of its being left with a natural finish for scrubbing, is of spruce so as to give a white appearance. These dressers are considered millwork and not furniture and are made in millwork factories along with the other interior finish.

Miscellaneous fittings.—Other items now fitted in many of the new dwelling houses are built-in shaving cabinets, serving hatches to facilitate the passing of food from the kitchen to dining room, and linen cupboards, the latter being built around the hot-water cylinder tank in the bathroom and used for storing towels. All of these are considered millwork and are manufactured in factories specializing in such work.

COMPETITION FROM WOOD SUBSTITUTES

The use of metal window sash is making considerable progress, but so far they have been largely confined to casement types, and they are used in office and other public buildings and dwellings of the more expensive kind. Whether they will ever be entirely successful for ordinary houses is somewhat doubtful on account of the cold which would seem to penetrate so much more through a metal than a wood sash and the great tendency to rust in the damp climate of the British Isles, making frequent repainting a necessity.

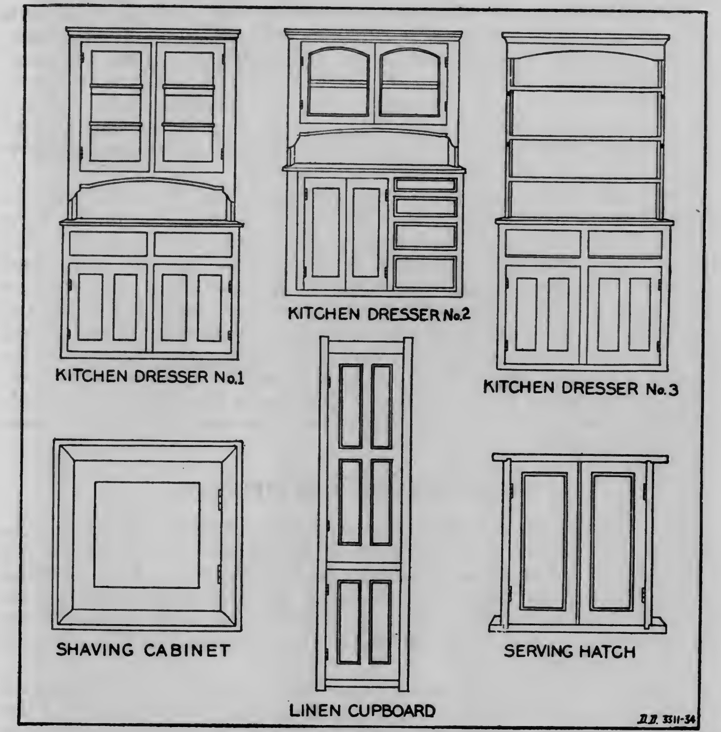


Fig. 36.—Miscellaneous house fittings

UTILIZATION OF WASTE

Although not general, some modern factories are equipped with pneumatic collecting and conveying systems to gather the shavings and sawdust, which are used principally for fuel, while in a few, wood flour is manufactured as a subsidiary part of their operation.

BANK, OFFICE, AND STORE FITTINGS

The fittings of banks, offices, and stores provide an important outlet for the more valuable hardwoods that is of considerable significance to the American exporters of oak, walnut, mahogany, and yellow poplar, which woods are used to a large extent for this work.

BANK AND OFFICE FITTINGS

With the exception of a few large contractors who do their own work the manufacture of interior fittings for banks, insurance, steamship, and similar offices is done by firms who specialize in this business. The work is generally done in the factory, erected and given a finishing polish on the job. Mahogany and American black walnut are the favorite species, used either in the solid or veneer, and to some extent oak. Where a less expensive job is required, yellow poplar stained to the desired finish is utilized.

The main banking rooms in Great Britain differ from those in the United States in that the tellers are separated from the public by a wide counter, the top of which is invariably made of mahogany. The use of wood paneling is general in most of the modern banks and insurance offices and is growing in use for private offices. On account of its cost, mahogany is confined to places where price is a secondary consideration, oak of either the Austrian or Japanese variety being the popular wood for general purposes. However, because of its beautiful natural figure, the large sizes in which it can be obtained, and very moderate price, the use of slash-grain Douglas fir for panelwork is growing in favor, and many beautiful color effects have been obtained by the use of stain.

STORE FIXTURES AND FITTINGS

The manufacture of store fronts, display fittings, fitting rooms, cash desks, and other equipment is in the hands of a comparatively few large firms who make a specialty of this business. Most of them are members of the National Association of Shopfitters, which has its headquarters in London. The ramifications of some of these firms spread all over the world, an extensive business being done with foreign countries.

Fronts and display windows.—While most store fronts are designed by the fitters, the work is occasionally done under the direction of the owners' architects. Over 90 per cent of the high-class store fronts in Great Britain are of bronze metal drawn on hardwood cores, although occasionally they are of all wood to suit the fancy of the proprietor, oak, mahogany, teak, and sometimes walnut being used for this purpose. As it is the object of the shopfitter to have as little obstruction to the view as possible, the size of the framing in window fronts is reduced to a minimum. Many materials are used for facias, and they are usually chosen to harmonize with the rest of the front or, if of wood, finished to do so. Various marbles and building stone are used with lettering superimposed either of metal or wood. When the facias are of wood, American yellow poplar is most often used and, to a small extent, cypress, magnolia, and teak.

The entrance doors are supplied by the fitters and are frequently of metal, but mahogany, walnut, and oak are also used. The doors

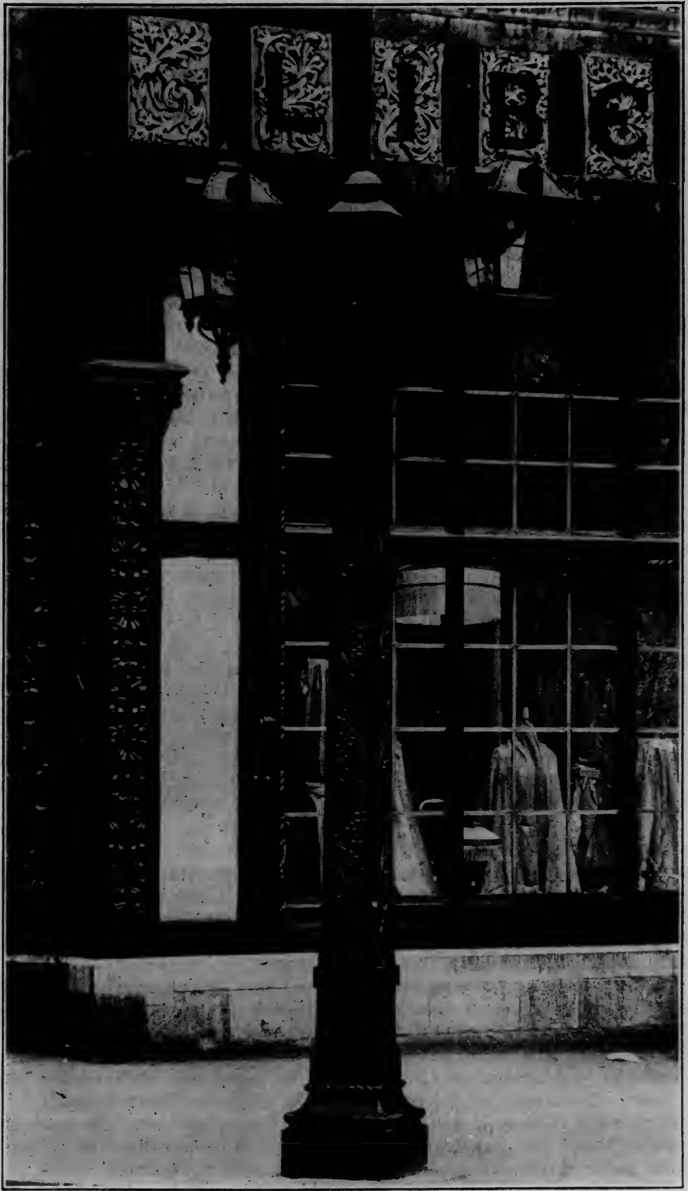


FIG. 37.—Unique use of oak from old British battleships

BANK, OFFICE, AND STORE FITTINGS

The fittings of banks, offices, and stores provide an important outlet for the more valuable hardwoods that is of considerable significance to the American exporters of oak, walnut, mahogany, and yellow poplar, which woods are used to a large extent for this work.

BANK AND OFFICE FITTINGS

With the exception of a few large contractors who do their own work the manufacture of interior fittings for banks, insurance, steamship, and similar offices is done by firms who specialize in this business. The work is generally done in the factory, erected and given a finishing polish on the job. Mahogany and American black walnut are the favorite species, used either in the solid or veneer, and to some extent oak. Where a less expensive job is required, yellow poplar stained to the desired finish is utilized.

The main banking rooms in Great Britain differ from those in the United States in that the tellers are separated from the public by a wide counter, the top of which is invariably made of mahogany. The use of wood paneling is general in most of the modern banks and insurance offices and is growing in use for private offices. On account of its cost, mahogany is confined to places where price is a secondary consideration, oak of either the Austrian or Japanese variety being the popular wood for general purposes. However, because of its beautiful natural figure, the large sizes in which it can be obtained, and very moderate price, the use of slash-grain Douglas fir for panelwork is growing in favor, and many beautiful color effects have been obtained by the use of stain.

STORE FIXTURES AND FITTINGS

The manufacture of store fronts, display fittings, fitting rooms, cash desks, and other equipment is in the hands of a comparatively few large firms who make a specialty of this business. Most of them are members of the National Association of Shopfitters, which has its headquarters in London. The ramifications of some of these firms spread all over the world, an extensive business being done with foreign countries.

Fronts and display windows.—While most store fronts are designed by the fitters, the work is occasionally done under the direction of the owners' architects. Over 90 per cent of the high-class store fronts in Great Britain are of bronze metal drawn on hardwood cores, although occasionally they are of all wood to suit the fancy of the proprietor, oak, mahogany, teak, and sometimes walnut being used for this purpose. As it is the object of the shopfitter to have as little obstruction to the view as possible, the size of the framing in window fronts is reduced to a minimum. Many materials are used for facias, and they are usually chosen to harmonize with the rest of the front or, if of wood, finished to do so. Various marbles and building stone are used with lettering superimposed either of metal or wood. When the facias are of wood, American yellow poplar is most often used and, to a small extent, cypress, magnolia, and teak.

The entrance doors are supplied by the fitters and are frequently of metal, but mahogany, walnut, and oak are also used. The doors

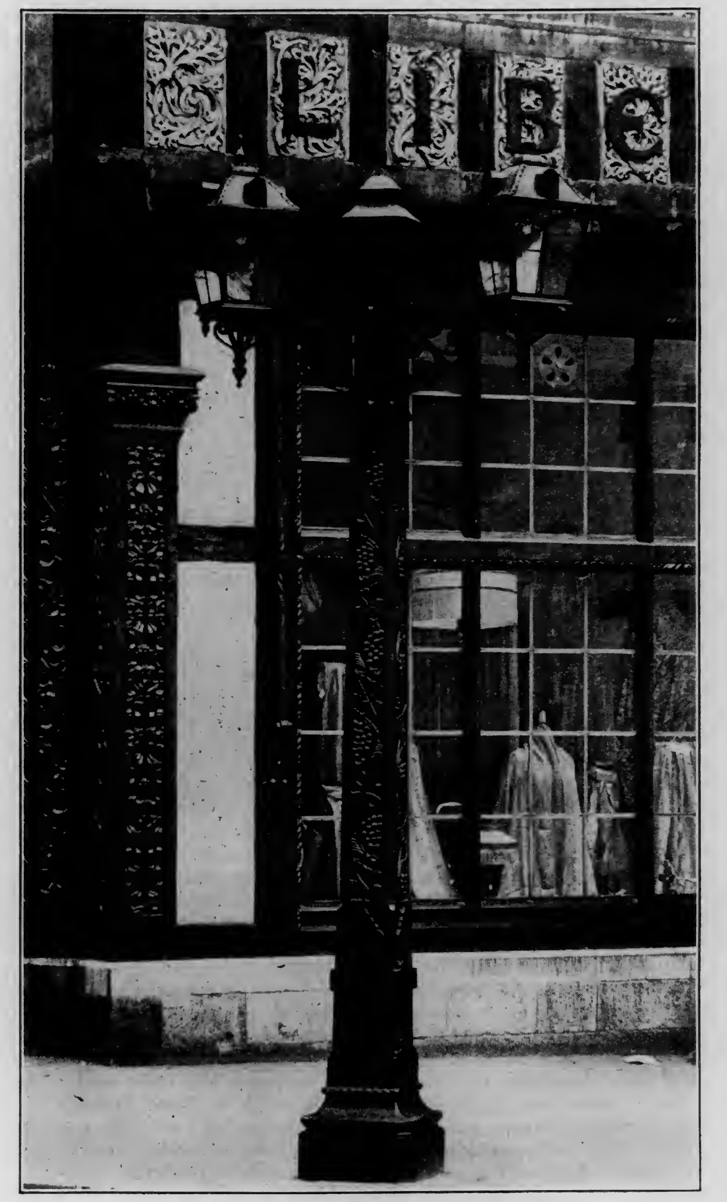


FIG. 37.—Unique use of oak from old British battleships

seldom have solid panels, but as a rule are fitted with glass. There is naturally no standard size to these doors, which are made specially for each job in accordance with the general design of the front.

Pattern parquet, either of oak or of oak and American black walnut, is used very largely for the floors of store windows, its attractive appearance adding to the displays. While most of the parquet used is imported from continental Europe and made out of Austrian oak, some store fitters make their own out of American white oak, preferring the lighter-colored wood as a background for the goods display.

French walnut is extensively used in veneered panels for window inclosures and is the most popular wood used for this purpose in Great Britain to-day. The French variety of walnut is much lighter in color than the American, and many beautiful effects in matched panels may be seen in the big London department-store windows. While French walnut is used for window inclosures, American black walnut is preferred for interior finish and trim.

Show cases, display fittings, etc.—Cabinet show cases are frequently elaborate in design and are very costly, some running as high as $2,500. Mahogany is generally used and to a smaller extent oak and walnut. These usually have a metal framework faced with wood and are fitted with plate-glass shelves. The backs are frequently lined with beautiful examples of figured veneer, while the bottoms are carried out in pattern parquet, sometimes of mahogany or walnut if the case is made of that wood, but by far the greater number are floored with American white oak parquet.

Fittings, such as robe cases, fitting-room screens, counters, and stock cases used in the retailing of textile goods, have been largely standardized and made in units which can be built up to make any size case. They can be packed flat and erected on the job by anyone without previous experience. Oak is by far the most used for this work, followed to a small extent by mahogany and walnut, while for export to the Far East teak is used. High-class stores also sometimes order their fittings made from fancy Indian and other tropical hardwoods. These stock cases have solid sides and fronts, while the bottoms are made of three-ply north European birch. The trays are made suitably partitioned for various items of dry goods, such as haberdashery and notions. The use of cash desks, many of which are ornamental in design and shaped to fit into any available space, is growing. Various woods are used in their manufacture, mahogany being preferred by the better-class stores. The introduction of the hire-purchase system for store fittings, enabling their purchase out of income instead of capital, has materially increased the demand for standardized units from the smaller stores.

Sundry display fittings, tables, etc.—There is considerable demand for the retail trade for pedestals, stands, plateaus, tier and other small tables used for window, counter, and other display purposes. These tables are made in both modern and period designs, such as Jacobean, Georgian, or Queen Anne, to meet the taste of the purchaser. American white oak is chiefly used for their manufacture, but there is a certain demand from the larger and also the exclusive type of store for mahogany and walnut. Birch, stained to resemble these more expensive woods, is also used to some extent.

Many of these fittings require shelves, for which oak or birch plywood is largely used. Display easels are also largely made of plywood, those with a veneered face of figured walnut being most popular, while the cheaper kinds are made in oak.

Some store fitters also make millinery and costume boxes, three-ply birch in a natural finish being largely used for this purpose.

WOOD-BLOCK PAVING

Wood-block paving is extensively used in Great Britain. Its use is steadily increasing and superseding other kinds of paving in many cities, particularly for streets subjected to heavy traffic. It is doubtful if any roads in the world have to bear as heavy and continuous traffic as those of London; and yet, after 50 years' use in the principal thoroughfares, it has been found the most durable of any paving material, in many instances wearing for 15 years and over before repaving was found necessary.

In addition to streets, wood blocks are also extensively used for paving between street-car rails and on bridges, and also, to a small extent, for floors of factories, warehouses, garages, railroad freight sheds, and drill halls; but, for whatever purpose, the blocks are always creosoted before being laid.

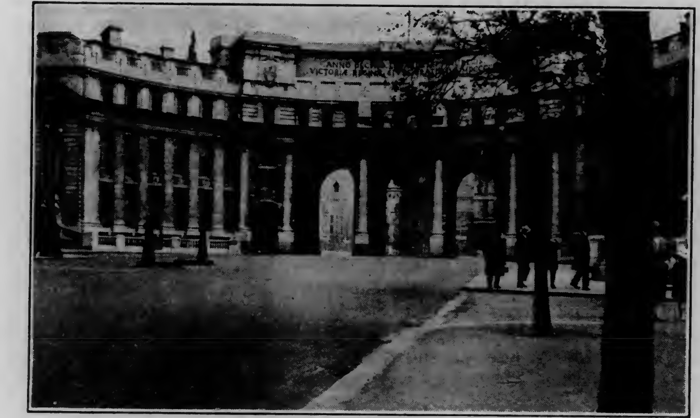


FIG. 38.—The Mall, London, paved entirely with wood blocks. Admiralty Arch in background

Not for its durability only is wood-block paving preferred, however, but it is claimed that it wears smoothly and evenly for a longer period than other pavements and in all kinds of weather is less slippery than other materials. It is also a silent paving, absorbing to a great extent the noise and vibration of traffic and machinery, and, by reason of the antiseptic qualities in the creosote oil, is a highly sanitary pavement.

ORGANIZATION OF PAVING INDUSTRY

The wood-block paving industry is in the hands of a few companies who specialize in it. Most of these operate their own treating plants and besides laying the pavement in some instances contract to keep it in repair for several years at fixed annual payments.

seldom have solid panels, but as a rule are fitted with glass. There is naturally no standard size to these doors, which are made specially for each job in accordance with the general design of the front.

Pattern parquet, either of oak or of oak and American black walnut, is used very largely for the floors of store windows, its attractive appearance adding to the displays. While most of the parquet used is imported from continental Europe and made out of Austrian oak, some store fitters make their own out of American white oak, preferring the lighter-colored wood as a background for the goods display.

French walnut is extensively used in veneered panels for window inclosures and is the most popular wood used for this purpose in Great Britain to-day. The French variety of walnut is much lighter in color than the American, and many beautiful effects in matched panels may be seen in the big London department-store windows. While French walnut is used for window inclosures, American black walnut is preferred for interior finish and trim.

Show cases, display fittings, etc.—Cabinet show cases are frequently elaborate in design and are very costly, some running as high as $2,500. Mahogany is generally used and to a smaller extent oak and walnut. These usually have a metal framework faced with wood and are fitted with plate-glass shelves. The backs are frequently lined with beautiful examples of figured veneer, while the bottoms are carried out in pattern parquet, sometimes of mahogany or walnut if the case is made of that wood, but by far the greater number are floored with American white oak parquet.

Fittings, such as robe cases, fitting-room screens, counters, and stock cases used in the retailing of textile goods, have been largely standardized and made in units which can be built up to make any size case. They can be packed flat and erected on the job by anyone without previous experience. Oak is by far the most used for this work, followed to a small extent by mahogany and walnut, while for export to the Far East teak is used. High-class stores also sometimes order their fittings made from fancy Indian and other tropical hardwoods. These stock cases have solid sides and fronts, while the bottoms are made of three-ply north European birch. The trays are made suitably partitioned for various items of dry goods, such as haberdashery and notions. The use of cash desks, many of which are ornamental in design and shaped to fit into any available space, is growing. Various woods are used in their manufacture, mahogany being preferred by the better-class stores. The introduction of the hire-purchase system for store fittings, enabling their purchase out of income instead of capital, has materially increased the demand for standardized units from the smaller stores.

Sundry display fittings, tables, etc.—There is considerable demand for the retail trade for pedestals, stands, plateaus, tier and other small tables used for window, counter, and other display purposes. These tables are made in both modern and period designs, such as Jacobean, Georgian, or Queen Anne, to meet the taste of the purchaser. American white oak is chiefly used for their manufacture, but there is a certain demand from the larger and also the exclusive type of store for mahogany and walnut. Birch, stained to resemble these more expensive woods, is also used to some extent.

Many of these fittings require shelves, for which oak or birch plywood is largely used. Display easels are also largely made of plywood, those with a veneered face of figured walnut being most popular, while the cheaper kinds are made in oak.

Some store fitters also make millinery and costume boxes, three-ply birch in a natural finish being largely used for this purpose.

WOOD-BLOCK PAVING

Wood-block paving is extensively used in Great Britain. Its use is steadily increasing and superseding other kinds of paving in many cities, particularly for streets subjected to heavy traffic. It is doubtful if any roads in the world have to bear as heavy and continuous traffic as those of London; and yet, after 50 years' use in the principal thoroughfares, it has been found the most durable of any paving material, in many instances wearing for 15 years and over before repaving was found necessary.

In addition to streets, wood blocks are also extensively used for paving between street-car rails and on bridges, and also, to a small extent, for floors of factories, warehouses, garages, railroad freight sheds, and drill halls; but, for whatever purpose, the blocks are always creosoted before being laid.

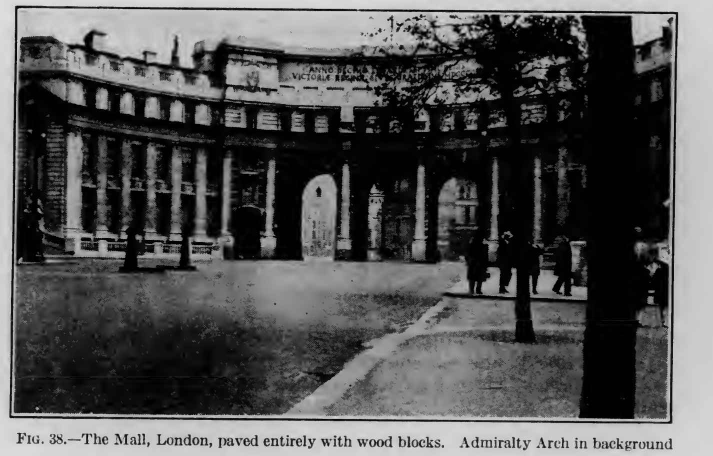


FIG. 38.—The Mall, London, paved entirely with wood blocks. Admiralty Arch in background

Not for its durability only is wood-block paving preferred, however, but it is claimed that it wears smoothly and evenly for a longer period than other pavements and in all kinds of weather is less slippery than other materials. It is also a silent paving, absorbing to a great extent the noise and vibration of traffic and machinery, and, by reason of the antiseptic qualities in the creosote oil, is a highly sanitary pavement.

ORGANIZATION OF PAVING INDUSTRY

The wood-block paving industry is in the hands of a few companies who specialize in it. Most of these operate their own treating plants and besides laying the pavement in some instances contract to keep it in repair for several years at fixed annual payments.

WOODS USED

"Unsorted" quality pine (*Pinus sylvestris*) from the Baltic States and Poland supplies the bulk of Great Britain's requirements of paving-block material. Finnish and occasionally "unsorted" Swedish or third-quality Russian pine are sometimes used, but pine from those countries is generally too valuable for paving blocks, and price is the main consideration for paving-block material. Both deals and ends are imported, and as they are cut into the required lengths on arrival the average length is of no importance. The principal sizes used for paving blocks are 3 by 8 inches and 3 by 9 inches, the wood must be sound, while tight knots and centers are not objected to. It is essential, however, that the stock be exact to size and 100 per cent square edged. As the wood is to be creosoted, discoloration makes little difference, although naturally a lower price is paid for discolored than for bright stock, usually about 10s. per standard.

While experiments have been made with several hardwoods, they have made little headway against north European pine, because it has been found that they did not wear smooth and even, were more subject to contraction and expansion, and, what was more serious, that they shattered the surface of the concrete foundation, necessitating repairs at frequent intervals.

PRICES OF NORTH EUROPEAN PAVING STOCK

During the late summer of 1927 the approximate value of Baltic 3 by 9 inch "unsorted" pine in regular lengths for paving blocks was £16 per standard, c. i. f. United Kingdom east coast ports, with 8-inch at 5s. less. Discolored stock usually sells at a discount of 10s. per standard, the discoloration making little difference as the wood is to be creosoted and, in many instances, is in greater demand than the "bright" stock on account of its lower price. In addition to the regular lengths, there are imported large quantities of 5 to 9 foot ends from Latvia, the approximate market price for which was £14 10s. per standard, and as short lengths answer the purpose of the paving companies almost as well as the long, the saving in cost is important.

SIZE OF BLOCKS AND METHOD OF LAYING

The deals are first cut into the required lengths, 5 inches being most generally used, although sometimes 3, 3½, or 4 inch blocks are called for, after which they are creosoted, an impregnation of 8 pounds to the cubic foot being usual. These blocks are laid on their edge on a concrete foundation 9 to 12 inches deep, depending upon the engineers' requirements, in such a manner as to overlap.

When laid, the pavement is finished with a grouting of hot bitumen, which is poured over and between the blocks to give complete adhesion and so form a waterproof binding to prevent water getting between the foundation and surface. Finally, the paving is given a coating of fine gravel to give it a hard wearing surface.

While the close-jointed laying is generally adopted, it can not be said that it is entirely successful, for the reason that sometimes, owing to the heavy traffic causing movement of the blocks or cold weather preventing the bitumen binder to penetrate completely, water enters the joints, with the result that damage is caused to the foundation. In order to obviate this difficulty, various types of blocks have been made, one in particular which is now being extensively used having a strip about 1 inch wide and ⅛ inch thick nailed to the bottom and two smaller pieces to the sides near the top, while another type has a slight groove cut in the side and one end of each block. The object of both of these is to keep the blocks slightly apart and thus enable the binding fluid to pass down between the blocks and make an absolutely water-tight binding.

AMERICAN OPPORTUNITIES

Although the United States has only slightly participated in furnishing wood-paving material to Great Britain, it is not because there are no suitable species available but rather lack of effort to meet the requirements of this particular industry.

The fact that short lengths are not considered undesirable (large quantities of 5 to 9 foot ends from Latvia being used) would indicate an opportunity worth investigating by American lumber exporters.

The great handicap, as far as the United States softwoods are concerned, is irregularity of manufacture. Uniformity and exactness of size is absolutely essential in paving blocks, otherwise they will not fit when laid, and it is these qualities that are the outstanding characteristics of north European softwood lumber manufactured by the Swedish gang or frame saw method, but unfortunately not of that received from the United States. A few years ago one of the largest operators in wood-block paving, after much persuasion, ordered a sample shipment of Douglas fir, and although the necessity for the lumber being exact to size was impressed upon the shipper, it was found on arrival to contain only about 30 per cent of accurately sawn lumber, the balance being either under or over size. As a result, the undersize had to be disposed of for other than paving-block purposes, while considerable expense was incurred in dressing down the heavy lumber to the size required.

In consequence of this experience a feeling of opposition to American lumber was engendered that will be most difficult to eradicate. However, in spite of this experience of one company, there would appear to be a good opening for Douglas fir 3 by 9 and 3 by 8 inches in lengths of 5 feet and longer, provided this difficulty of irregularity of manufacture can be overcome. For several years there has been little call for deal sizes in Great Britain, and very low prices were frequently accepted for paving stock, but with the improvement in conditions in the heavy industries the demand is increasing and the necessity for cutting prices by importers in order to get rid of the percentage they were compelled to take on their contracts has largely disappeared.

An outlet for wood paving blocks that has been but little exploited is for factory flooring, and it would probably be to the advantage of American lumber exporters to furnish their British agents with complete technical information in regard to its use in the United States.

While no figures are available as to the quantity of lumber used for paving blocks it is estimated by a leading authority in the industry that between 80,000,000 and 100,000,000 feet board measure are required annually for new paving and repair work, and the demand is growing year by year.

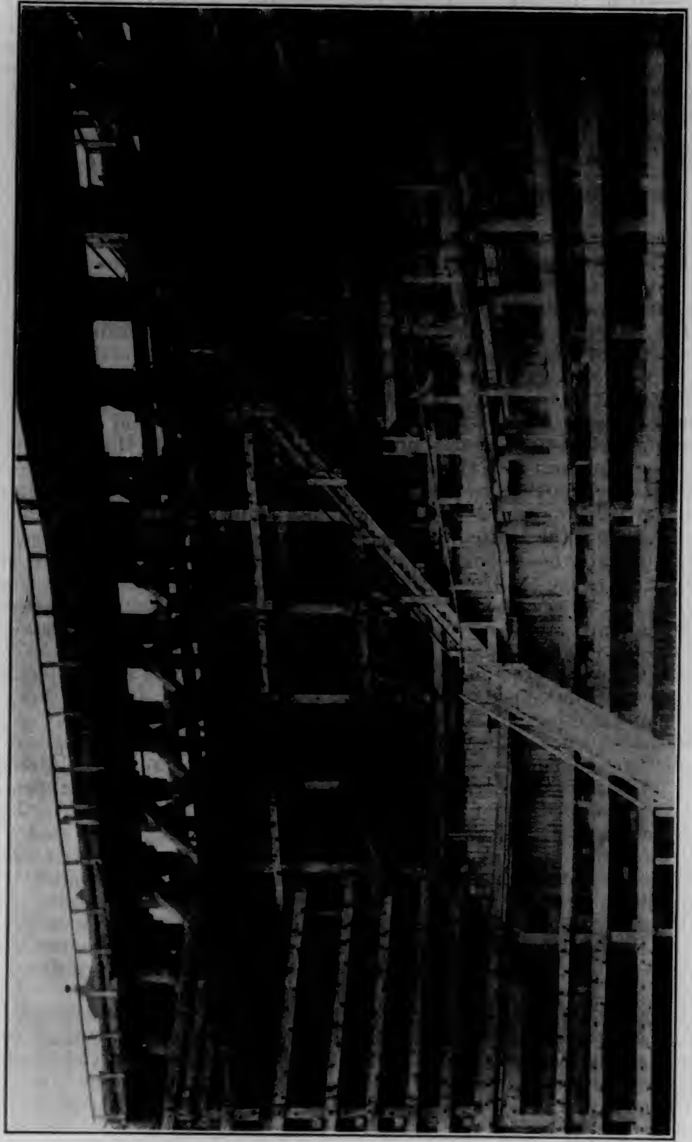


FIG. 39.—Temporary bulkheading, of southern pine, at one of the world's largest docks. For dock construction southern pine is without a rival in Great Britain

DOCK AND HARBOR CONSTRUCTION

Many of the docks and harbors of Great Britain are owned and controlled by public or semipublic bodies whose object is to operate them efficiently at the least possible expense. No profits are aimed at, all surplus income after expenses and interest charges have been met being applied to the reduction of dues. The most notable of these are the Port of London Authority at London and the Mersey Dock and Harbor Board at Liverpool, also the Clyde Trustees at Glasgow. In addition to these, the large railroad systems all have extensive dock holdings, the principal being the London Midland & Scottish at Garston, near Liverpool, Fleetwood, Preston, and Barrow-in-Furness, also Grangemouth in Scotland; the London & North Eastern Railway at Hull, Grimsby, Hartlepool, Middlesbrough, and Newcastle-on-Tyne; the Great Western Railway at Barry, Cardiff, Newport, and Swansea in South Wales, and Plymouth; and the Southern Railway operates the dock system at Southampton. Some dock systems are owned and operated by the municipalities, among the most important being Newcastle-on-Tyne, Bristol, and Preston, and there is the extensive dock system at Manchester owned by the Manchester Ship Canal Co.

As well as what may be called regular docks, there are scattered all around the coast hundreds of seaside resorts and small ports, also many cities which, being located on rivers, are dependent upon ferries for cross-river traffic. All of these require landing facilities that have to be maintained, and considerable material is required to keep them in good condition.

METHOD OF CONSTRUCTION

With few exceptions the ports of Great Britain are located on tidal waters, so that the docks, unlike most American, are not piers or wharves built alongside or out into deep water but must be excavated out of adjoining land, thus forming an inland water basin. The building and maintenance of these docks and storage sheds pertaining thereto consume a large quantity of lumber and timber. This work is of great importance to the United States lumber export trade because most of the timber for such construction is imported from that country.

Any extension of British dock systems—and extensions are constantly being made owing to the necessity of providing accommodations to meet the great increase in size of vessels that has taken place since most of the present docks were built—is therefore of the greatest importance to American lumber exporters.

PRINCIPAL WOODS USED

Southern pine.—Of the various woods used for dock construction southern pine, or "pitch pine," as it is called, is the most important, and upon the activity in this industry, to a great extent, depends the demand for this wood. The chief use is for temporary bulkheading during the process of excavation for the dock and permanent piling. Sawn timber 12 to 14 inches, side, averaging about 30 feet long, is largely used for this purpose, and to a smaller extent pieces having a 16-inch side.

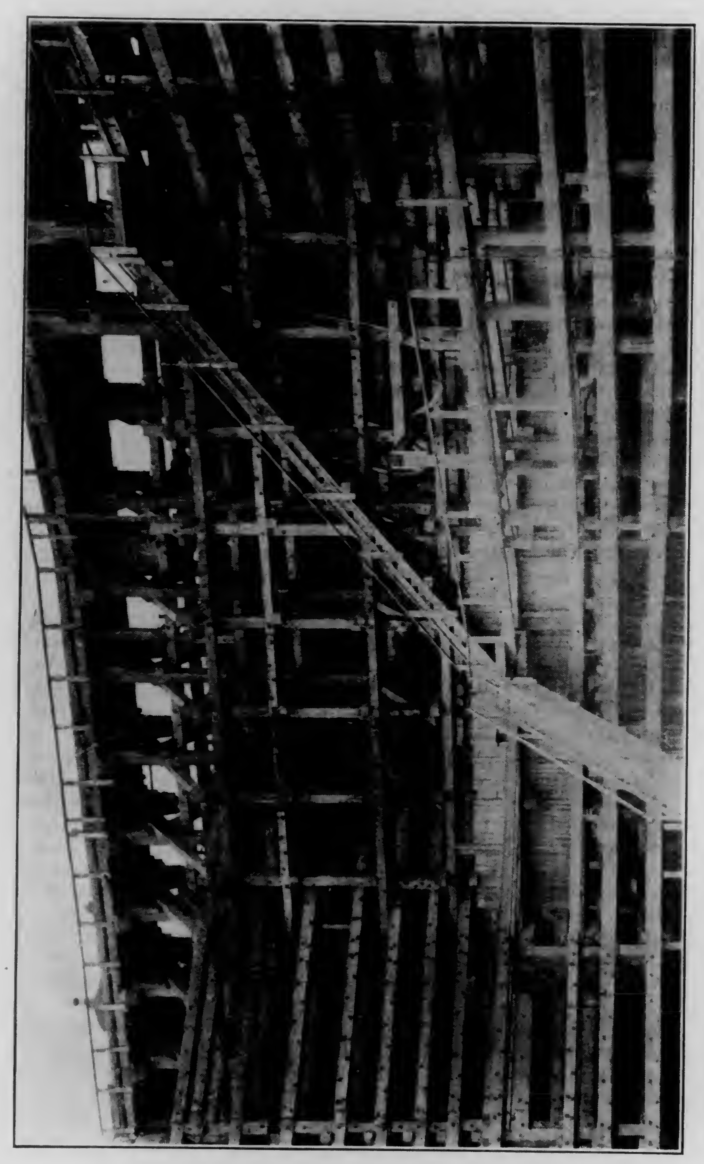


Fig. 39.—Temporary bulkheading, of southern pine, at one of the world's largest docks. For dock construction southern pine is without a rival in Great Britain

DOCK AND HARBOR CONSTRUCTION

Many of the docks and harbors of Great Britain are owned and controlled by public or semipublic bodies whose object is to operate them efficiently at the least possible expense. No profits are aimed at, all surplus income after expenses and interest charges have been met being applied to the reduction of dues. The most notable of these are the Port of London Authority at London and the Mersey Dock and Harbor Board at Liverpool, also the Clyde Trustees at Glasgow. In addition to these, the large railroad systems all have extensive dock holdings, the principal being the London Midland & Scottish at Garston, near Liverpool, Fleetwood, Preston, and Barrow-in-Furness, also Grangemouth in Scotland; the London & North Eastern Railway at Hull, Grimsby, Hartlepool, Middlesbrough, and Newcastle-on-Tyne; the Great Western Railway at Barry, Cardiff, Newport, and Swansea in South Wales, and Plymouth; and the Southern Railway operates the dock system at Southampton. Some dock systems are owned and operated by the municipalities, among the most important being Newcastle-on-Tyne, Bristol, and Preston, and there is the extensive dock system at Manchester owned by the Manchester Ship Canal Co.

As well as what may be called regular docks, there are scattered all around the coast hundreds of seaside resorts and small ports, also many cities which, being located on rivers, are dependent upon ferries for cross-river traffic. All of these require landing facilities that have to be maintained, and considerable material is required to keep them in good condition.

METHOD OF CONSTRUCTION

With few exceptions the ports of Great Britain are located on tidal waters, so that the docks, unlike most American, are not piers or wharves built alongside or out into deep water but must be excavated out of adjoining land, thus forming an inland water basin. The building and maintenance of these docks and storage sheds pertaining thereto consume a large quantity of lumber and timber. This work is of great importance to the United States lumber export trade because most of the timber for such construction is imported from that country.

Any extension of British dock systems—and extensions are constantly being made owing to the necessity of providing accommodations to meet the great increase in size of vessels that has taken place since most of the present docks were built—is therefore of the greatest importance to American lumber exporters.

PRINCIPAL WOODS USED

Southern pine.—Of the various woods used for dock construction southern pine, or "pitch pine," as it is called, is the most important, and upon the activity in this industry, to a great extent, depends the demand for this wood. The chief use is for temporary bulkheading during the process of excavation for the dock and permanent piling. Sawn timber 12 to 14 inches, side, averaging about 30 feet long, is largely used for this purpose, and to a smaller extent pieces having a 16-inch side.

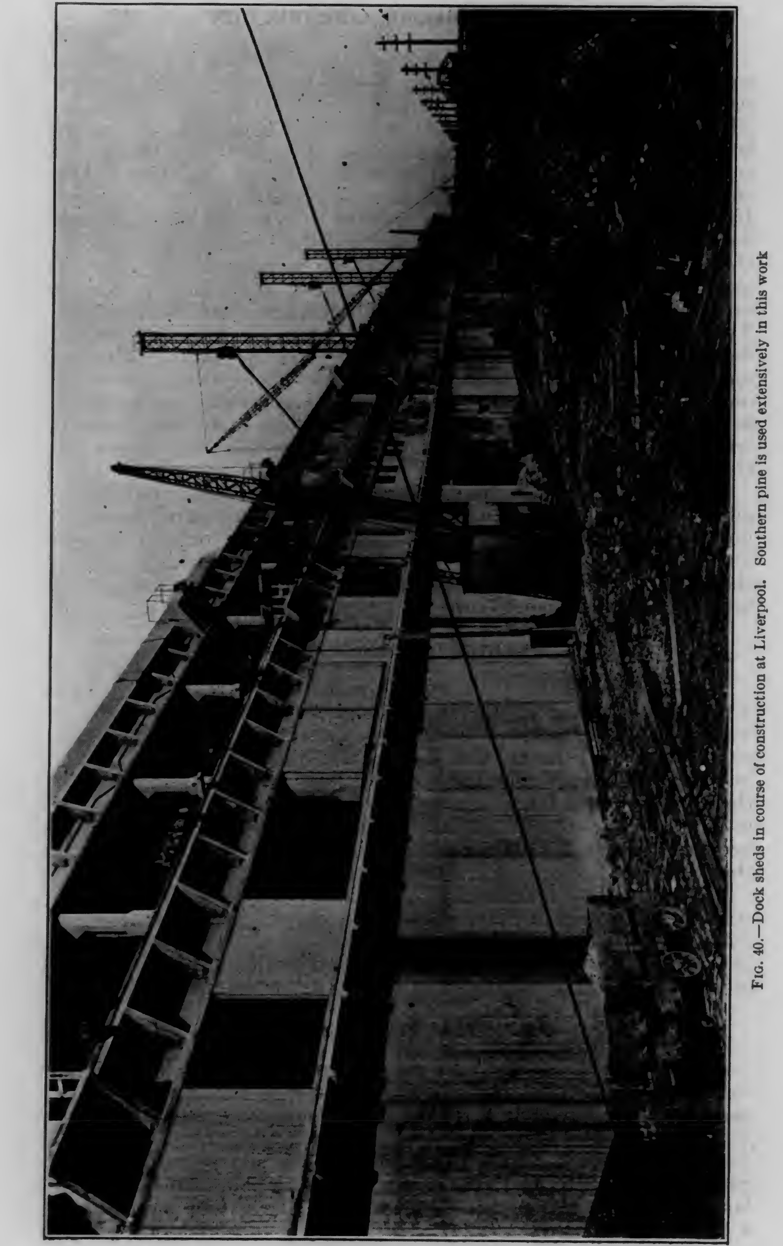


FIG. 40.—Dock sheds in course of construction at Liverpool. Southern pine is used extensively in this work

Before driving, the piece is capped with an iron hoop to prevent splitting and the lower end is protected with an iron shoe.

Although other species have been tried for dock work, southern pine, in spite of its price, has been found without an equal, the cost of the timber being of secondary importance compared with the importance of the work involved and the safety of the workmen's lives.

In addition to the square piling timber, planks 6 by 12 inches and 7 by 12 inches are also used for heavy joists. Temporary railroads for carrying material are frequently built during the construction of a large dock, which often takes several years to complete, and for these southern pine switch ties or crossings 6 by 12 inches are required.

While most sheds are now built of reinforced concrete, considerable quantities of southern pine timber is used for temporary supports and for concrete forms.

In addition to the building of the dock itself, piling of this wood is also used for boat landing and amusement piers and breakwaters.

Generally speaking, southern pine and Douglas fir are treated before being used for permanent work, while if for temporary structures they are used untreated.

Douglas fir.—Next to southern pine the wood most used in dock construction is Douglas fir. While the first-named species is still often preferred, the increasing difficulty in obtaining the long lengths and large sizes required for this work, together with advancing values, is causing Douglas fir to be used now where formerly it would not have been considered. While the quantity so far used for this purpose is comparatively small, its use is steadily increasing not only for bulkheading and other temporary work but for permanent work also.

Greenheart.—In order to keep the water from running out with the falling tide, docks are entered from the main waterway through gates which are usually opened for the entrance and exit of vessels during a limited period before and after high water. These gates are of exceedingly massive construction, as is necessary if they are to successfully withstand the pressure when the water level is lower on one side than the other. For the building of dock gates greenheart has been used in Great Britain ever since the present methods of dock construction have been practiced. It stands salt water without decay, resists the ravages of the teredo, and has been found sound after being used for 50 years.

In addition to dock gates, greenheart is used for piling and pierhead decking, but its high cost limits its use for this latter purpose.

Elm.—Both native and Canadian rock elm are used to a small extent, principally as fenders on dock gates and aprons, also on landing piers, as a protection from ships rubbing against them.

Other woods used.—Among other woods used are Quebec spruce for scaffolding boards, lower port Canadian spruce and north European softwoods for ordinary dam and sheeting work, while north European matching is used to some extent for shed doors, although most of these are now of metal on account of its fire-resisting qualities.

In addition to these, Quebec white pine is used for pattern making, although the quantity required is comparatively small. Formerly some Australian karri and jarrah was used for dock piling, but it is doubtful if any has been used for this purpose during recent years.

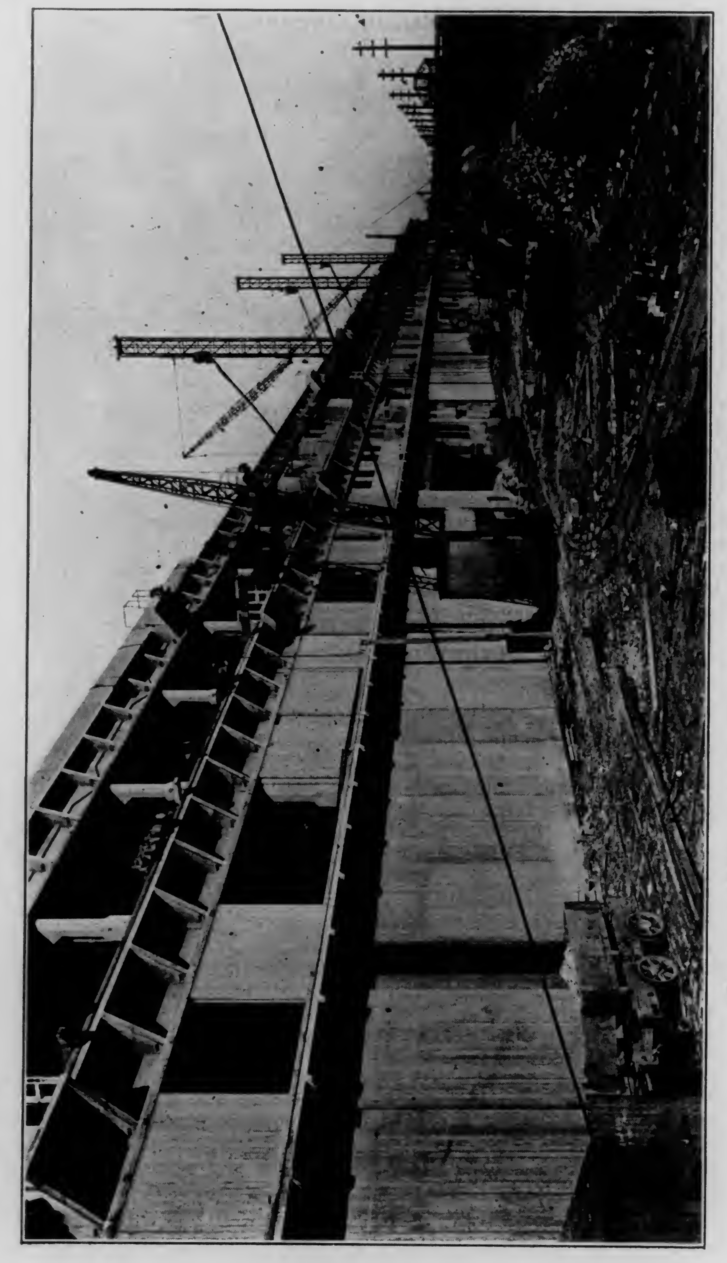


FIG. 40.—Dock sheds in course of construction at Liverpool. Southern pine is used extensively in this work

Before driving, the piece is capped with an iron hoop to prevent splitting and the lower end is protected with an iron shoe.

Although other species have been tried for dock work, southern pine, in spite of its price, has been found without an equal, the cost of the timber being of secondary importance compared with the importance of the work involved and the safety of the workmen's lives.

In addition to the square piling timber, planks 6 by 12 inches and 7 by 12 inches are also used for heavy joists. Temporary railroads for carrying material are frequently built during the construction of a large dock, which often takes several years to complete, and for these southern pine switch ties or crossings 6 by 12 inches are required.

While most sheds are now built of reinforced concrete, considerable quantities of southern pine timber is used for temporary supports and for concrete forms.

In addition to the building of the dock itself, piling of this wood is also used for boat landing and amusement piers and breakwaters.

Generally speaking, southern pine and Douglas fir are treated before being used for permanent work, while if for temporary structures they are used untreated.

Douglas fir.—Next to southern pine the wood most used in dock construction is Douglas fir. While the first-named species is still often preferred, the increasing difficulty in obtaining the long lengths and large sizes required for this work, together with advancing values, is causing Douglas fir to be used now where formerly it would not have been considered. While the quantity so far used for this purpose is comparatively small, its use is steadily increasing not only for bulkheading and other temporary work but for permanent work also.

Greenheart.—In order to keep the water from running out with the falling tide, docks are entered from the main waterway through gates which are usually opened for the entrance and exit of vessels during a limited period before and after high water. These gates are of exceedingly massive construction, as is necessary if they are to successfully withstand the pressure when the water level is lower on one side than the other. For the building of dock gates greenheart has been used in Great Britain ever since the present methods of dock construction have been practiced. It stands salt water without decay, resists the ravages of the teredo, and has been found sound after being used for 50 years.

In addition to dock gates, greenheart is used for piling and pierhead decking, but its high cost limits its use for this latter purpose.

Elm.—Both native and Canadian rock elm are used to a small extent, principally as fenders on dock gates and aprons, also on landing piers, as a protection from ships rubbing against them.

Other woods used.—Among other woods used are Quebec spruce for scaffolding boards, lower port Canadian spruce and north European softwoods for ordinary dam and sheeting work, while north European matching is used to some extent for shed doors, although most of these are now of metal on account of its fire-resisting qualities.

In addition to these, Quebec white pine is used for pattern making, although the quantity required is comparatively small. Formerly some Australian karri and jarrah was used for dock piling, but it is doubtful if any has been used for this purpose during recent years.

USE OF SUBSTITUTES

There has been a notable increase in the use of concrete during the past few years as a substitute for wood in dock and harbor construction. So far, it has not been found suitable for temporary bulkheading where the piling is drawn and used several times; also its lack of elasticity is a serious defect for, while wood will bend to a certain extent with the varying pressure, concrete will break. Another objection to concrete is that should the pile break when being driven it is difficult to withdraw the lower part, while, on the other hand, if under exceptional conditions a piece of wood piling breaks, it never does so clear through and no difficulty is experienced in pulling it out of the ground.

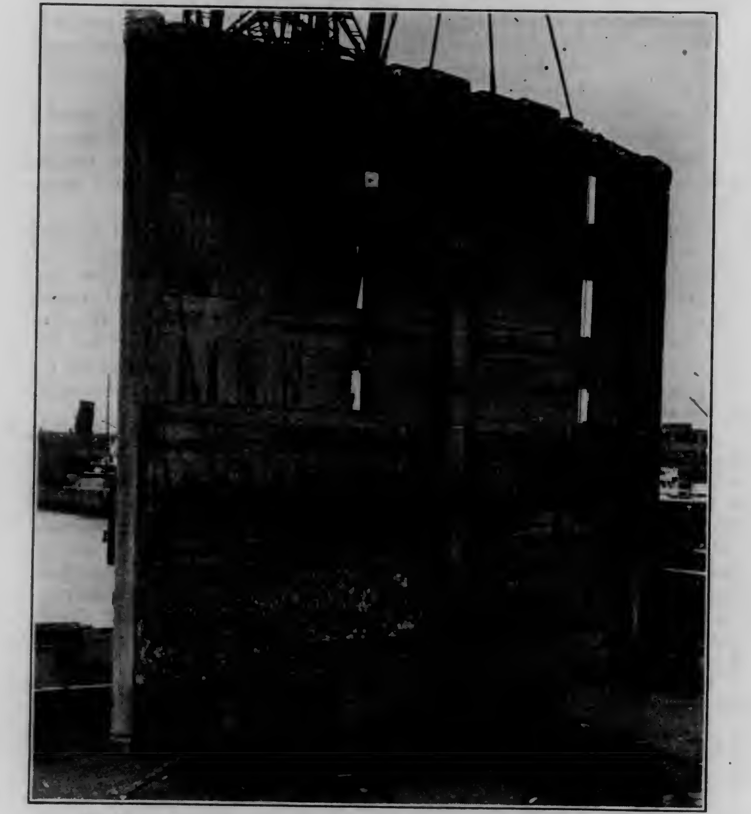


FIG. 41.—Gigantic dock gate of wood. Greenheart is extensively used in their construction

For permanent piling and apron work, however, there is a very definite movement toward concrete, a fender of elm being generally attached to protect it from damage by vessels colliding with it.

BOXES, CRATES, AND PACKING CASES

While no statistics are available as to the imports of box shooks or no data available regarding the consumption of lumber for the manufacture of boxes, crates, and packing cases, there is no doubt that very large quantities are needed not only for domestic requirements but also for the export trade, particularly of textile fabrics.

Generally speaking, the industry may be said to be divided into two groups, namely, the plants operated by manufacturers of products packed in standardized cases who make their own containers out of shooks, and plants operated by private companies specializing in the manufacture of wood containers. The principal business of the latter is catering to the needs of those whose requirements are not large enough to justify the operating of a box-making plant, and the great miscellaneous market which orders only a small number of containers of one particular size at a time, but the volume of whose business in the aggregate is considerable.

There is still a third group—i. e., forwarding agents—who, having a special knowledge of the requirements needed for particular goods destined to foreign countries, do the packing for their principals.

SPECIES USED AND SOURCES OF SUPPLY

Pine and spruce from northern Europe and to a lesser extent spruce from central Europe and Canada (the latter being confined largely to the Manchester district) constitute the principal woods used in Great Britain for boxes and packing cases. Where an odorless wood is required for packing food products spruce is always used.

If the lumber is required for the manufacture of standardized containers, it is imported in shook form, but if for the general box and packing-case industry the lower grades and short lengths of rough-sawn lumber and "firewood" are used. In addition, there are also imported round logs or "roundwood" from the White Sea district which are resawn into box lumber.

The softwoods mentioned hold nails well, take a smooth saw finish, and in addition are light in weight, an important factor where expensive transportation charges are involved.

PRODUCTION

Boxes, crates, etc.—According to the Census of Production, 1924, the output of firms making returns for wooden boxes, crates, and cases in Great Britain had a selling value of £5,370,000, the details of which are shown in the following statement:

	Selling value
Crates, cases, and boxes for packing merchandise (including rolling boards for cloth pieces)	£4, 708, 000
Chests and other wood boxes, etc	166, 000
Sawmill products	58, 000
Firewood	33, 000
Other products	358, 000
Work done on commission or "on hire" on lumber supplied (amount received for work done)	17, 000
	5, 340, 000

The aggregates shown in the foregoing do not express the value of all wood boxes, and crates, manufactured, inasmuch as these

USE OF SUBSTITUTES

There has been a notable increase in the use of concrete during the past few years as a substitute for wood in dock and harbor construction. So far, it has not been found suitable for temporary bulkheading where the piling is drawn and used several times; also its lack of elasticity is a serious defect for, while wood will bend to a certain extent with the varying pressure, concrete will break. Another objection to concrete is that should the pile break when being driven it is difficult to withdraw the lower part, while, on the other hand, if under exceptional conditions a piece of wood piling breaks, it never does so clear through and no difficulty is experienced in pulling it out of the ground.

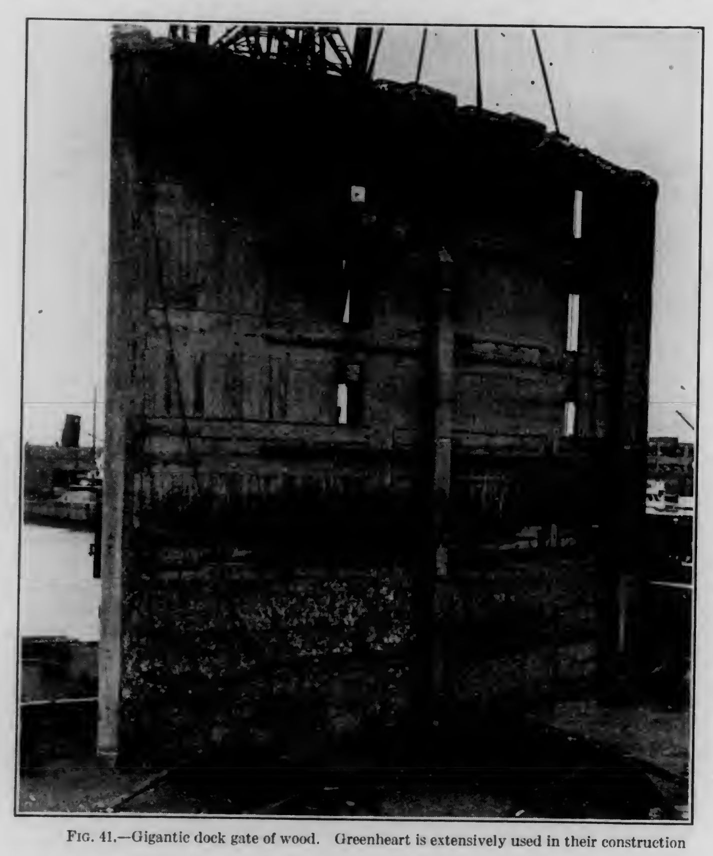


FIG. 41.—Gigantic dock gate of wood. Greenheart is extensively used in their construction

For permanent piling and apron work, however, there is a very definite movement toward concrete, a fender of elm being generally attached to protect it from damage by vessels colliding with it.

BOXES, CRATES, AND PACKING CASES

While no statistics are available as to the imports of box shooks or no data available regarding the consumption of lumber for the manufacture of boxes, crates, and packing cases, there is no doubt that very large quantities are needed not only for domestic requirements but also for the export trade, particularly of textile fabrics.

Generally speaking, the industry may be said to be divided into two groups, namely, the plants operated by manufacturers of products packed in standardized cases who make their own containers out of shooks, and plants operated by private companies specializing in the manufacture of wood containers. The principal business of the latter is catering to the needs of those whose requirements are not large enough to justify the operating of a box-making plant, and the great miscellaneous market which orders only a small number of containers of one particular size at a time, but the volume of whose business in the aggregate is considerable.

There is still a third group—i. e., forwarding agents—who, having a special knowledge of the requirements needed for particular goods destined to foreign countries, do the packing for their principals.

SPECIES USED AND SOURCES OF SUPPLY

Pine and spruce from northern Europe and to a lesser extent spruce from central Europe and Canada (the latter being confined largely to the Manchester district) constitute the principal woods used in Great Britain for boxes and packing cases. Where an odorless wood is required for packing food products spruce is always used.

If the lumber is required for the manufacture of standardized containers, it is imported in shook form, but if for the general box and packing-case industry the lower grades and short lengths of rough-sawn lumber and "firewood" are used. In addition, there are also imported round logs or "roundwood" from the White Sea district which are resawn into box lumber.

The softwoods mentioned hold nails well, take a smooth saw finish, and in addition are light in weight, an important factor where expensive transportation charges are involved.

PRODUCTION

Boxes, crates, etc.—According to the Census of Production, 1924, the output of firms making returns for wooden boxes, crates, and cases in Great Britain had a selling value of £5,370,000, the details of which are shown in the following statement:

	Selling value
Crates, cases, and boxes for packing merchandise (including rolling boards for cloth pieces)	£4, 708, 000
Chests and other wood boxes, etc	166, 000
Sawmill products	58, 000
Firewood	33, 000
Other products	358, 000
Work done on commission or "on hire" on lumber supplied (amount received for work done)	17, 000
	5, 340, 000

The aggregates shown in the foregoing do not express the value of all wood boxes, and crates, manufactured, inasmuch as these goods are produced as a subsidiary line by many woodworking firms whose returns are included in schedules for the lumber and related trades. The values are also exclusive of the output of crates and boxes made by manufacturing and merchanting firms for packing their own goods, except in the case of a few manufacturers who furnished separate returns in respect of their packing departments.

The average number of persons employed during the year 1924 at the factories to which the foregoing statement of output relates was 12,211, of whom 11,110 were recorded as operatives and 1,101 as management, clerical, and technical staff.

Packing cases.—As regards the great majority of products the work of packing is normally carried out by the manufacturers themselves. In the case of goods, such as cotton and other textile fabrics, however, which are largely manufactured for export, the work of packing and making up for shipment is frequently given out by the exporting firm to packing warehouses where the work is done "on commission" in accordance with the varying requirements of the export trade. These firms are situated mainly in Manchester and Bradford, and the particulars furnished in the following statement are those returned, according to the Census of Production, 1924, by firms in these cities who pack and make up "on commission" and also include similar work carried out by merchants who purchase goods for resale.

	Value
Packing (including making-up of customers' goods)	£3, 180, 000
Other work done	17, 000
Total	3, 197, 000

The value shown in this statement does not represent the aggregate value of all packing and making-up work in connection with textile fabrics, the value of such work when carried out by the manufacturer being included in the net selling value of the goods manufactured.

The average number of persons employed during 1924 at the factories to which the foregoing statement of output relates was 8,043, of whom 7,199 were recorded as operatives and 844 as management, clerical, and technical staff.

BOX SHOOKS

Finland, Sweden, Norway, and Latvia have a virtual monopoly of the British market for box shooks; the low transportation charge from these countries, together with the close methods of wood utilization practiced, enables them to stifle practically all competition. Box shooks are imported either rough or dressed, but mostly rough on account of price, and also because of lack of planing facilities in Finland, which country now holds the predominating position.

Both pine and spruce shooks are used, depending upon the product for which the container is intended.

In order to obtain the American customs drawback there is imported from the United States a small quantity of shooks for the manufacture of containers to be returned to that country filled with goods. The quantity, however, is very small, amounting to only 327,760 board feet in 1926.

Generally speaking, the main outlet for shooks is for the manufacture of standardized containers for such products as soap, margarine, sugar, and whisky, and are set up in the factories of the manufacturers of these products.

CONSUMING INDUSTRIES

The soap industry is probably the largest consumer of box shooks, which may be either of pine or spruce at shippers' option. The lumber is not dressed but resawn from thicker lumber by especially fine saws which make a smoother finish than lumber cut with an ordinary saw. Contracts usually do not allow outside boards to be included; in fact this exception may be said to apply to all shooks except the cheapest variety used by the fresh-fish trade.

It is estimated that about 40,000,000 to 45,000,000 feet board measure of box shooks are needed annually to meet the requirements of the soap industry. The business is almost exclusively placed to order, which varies with the requirement of the particular consumer.

The following is a good example of a typical shook specification for a 56-pound soap box, together with the approximate value in north European softwood during midsummer of 1927:

Specification of soap-box shook.—Two ends, 15⅝ by 6¼ by ½ inch, in one piece; two sides, 21 by 6¼ by 5/16 inch, in one piece; top and bottom, 21 by 15½ by 5/16 inch, in three pieces; at 6.75d. per shook, c. i. f.

Next in importance is the margarine industry, with an estimated annual consumption of about 20,000,000 to 25,000,000 feet board measure. These shooks must be cut from an odorless white wood, usually spruce. The chief demand is for shooks to make containers to hold 28 and 56 pounds, the specification and approximate 1927 value being as follows:

Specification of 28-pound margarin-box shook.—Two ends, 11 by 6¾ by ½ inch, in one piece; two sides, 13⅞ by 6¾ by ⅜ inch, in one piece; top and bottom, 13⅞ by 11¾ by ¼ inch, in two equal pieces; at 4.25d. per shook, c. i. f.

Specification of 56-pound margarin-box shook.—Two ends, 13¼ by 7 by ½ inch, in one piece; two sides, 21¼ by 7 by ⅜ inch, in one piece; top and bottom, 21¼ by 14 by 5/16 inch, in 2 to 3 pieces; no board may be less than 3 inches wide, and must be in multiples of ½ inch in width; at 6.75d. per shook, c. i. f.

Sugar refiners and whisky distillers are also important consumers of box shooks, each using about 8,000,000 to 10,000,000 feet annually, the usual specifications required by each, together with their approximate 1927 value, being as follows:

Specification of 112-pound sugar-box shook.—Two ends, 17 by 14 by 9/16 inch, in two to three pieces; two sides, 20½ by 17 by 7/16 inch, in two to three pieces; top and bottom, 20¼ by 14⅞ by 7/16 inch, in two to three pieces; four bars, 13⅞ by 2 by 9/16 inch; sides, top, and bottom to contain no piece less than 4 inches in width, cut from an odorless white wood; at 1s. 3½d. per shook, c. i. f.

Specification of whisky-case shook.—Two ends, 10⅝ by 10⅝ by ⅝ inch, in two pieces, 8 and 2⅝ inches, tongued and grooved and glued; two sides, 15 by 10⅝ by ½ inch, in two pieces, 8 and 2⅝ inches, tongued and grooved and glued; top and bottom, 15 by 11⅝ by 7/16 inch, in two equal pieces; sides and ends planed one side; cut from an odorless white wood; at 8.50d. per shook, c. i. f. Glasgow.

Other outlets for box shooks are for flowers, vegetables, and canned goods, taking a total of, say, another 20,000,000 feet board measure in the course of a year.

AMERICAN PARTICIPATION

In spite of many efforts American exporters have so far met with little success in breaking into the United Kingdom box-shook market. The low prices at which the north European product can be delivered, its lightness of weight, and favor with which it is looked upon by the consuming industries make it doubtful, even if the price difficulty could be overcome, for comparatively unknown (at least for this particular purpose) American woods to be purchased.

Another factor is that large quantities of shooks are made in the north European producing countries out of the lower grades of lumber and ends, which, owing to defects, are unsuitable for other purposes but which can be eliminated in cutting up for box shooks. It may therefore reasonably be assumed that shippers in those countries would not lose this business without making great efforts to retain it, and having the advantage of shipping on an ocean freight rate of about $6.50 per thousand feet, it is extremely doubtful if the American product could meet their prices.

MUSICAL INSTRUMENTS

The manufacture of musical instruments and parts is an important industry in Great Britain, requiring considerable quantities of valuable wood. According to the Census of Production, 1924, the output of musical instruments during that year of those factories whose returns were made under it was as shown in the following table:

Instruments and parts	Quantity	Selling value
	Number	
Automatic pianos	2,400	£252,000
Pianos, not automatic, complete	94,600	3,328,000
Automatic organs, complete	67	72,000
Organs, not automatic, complete	457	235,000
Reed and harmoniums	678	15,000
Total	1,202	322,000
Parts and accessories of pianos and organs:		
Keyboard sets for pianos	91,900	268,000
Actions for pianos	77,600	279,000
Rolls, perforated, for automatic pianos and organs	321,600	42,000
Other parts of pianos and organs		498,000
Total		1,087,000
Talking machines:		
Complete	277,400	901,000
Records	22,383,000	992,000
Parts, including motors		296,000
Total		2,189,000
Stringed musical instruments:		
Complete	30,100	43,000
Parts, including strings		23,000
Wind instruments (wood or metal):		
Complete	57,700	150,000
Parts		7,000
Musical instruments not elsewhere specified and parts thereof		87,000
All other products		189,000
Work done for the trade		18,000
Repairs (including renovation), upkeep, and tuning		560,000
Total value of goods made and work done		8,255,000

The average number of persons employed during the year 1924 at the factories to which the foregoing table of output relates was 20,053, of whom 18,065 consisted of operatives.

THE EXPORT TRADE

Exports to the value of £1,658,000 were made during 1924, consisting principally of talking-machine records (£633,300) and machine parts including motors (£155,900). In addition, pianos (not automatic) having a value of £273,500; parts and fittings of pianos and organs, £82,200; wind instruments and parts (mostly brass) £56,000; and automatic pianos to the value of £39,200 were also exported.

PIANOS

Great care must be taken in the selection and seasoning of the wood used in the manufacture of pianos because upon them largely depend the tonal qualities of the instrument. In order to insure a moisture content suitable for the climatic conditions prevalent in the United Kingdom, most factories are equipped with dry kilns.

Cases.—In modern piano construction the case is not only a protection for the working parts but also contributory to the volume and quality of musical sounds produced by the instrument. For that reason, the kinds of wood used are of material importance.

Many woods are used for piano cases but mahogany is by far the most popular, probably 90 per cent or more of all pianos made in the United Kingdom being finished in that wood. Other species used are walnut, oak, rosewood, and satinwood, while the black cases are made from pearwood stained, no other wood having been found so suitable for this purpose.

Except for the legs and certain end parts which are of solid wood, cases are finished in veneer applied to a core of some less expensive wood, for the high-class instruments American yellow poplar or wormy chestnut being preferred by many manufacturers, while others prefer birch or some other hardwood. Of paramount importance in the case of a grand piano is the rim. This rim, which passes without joint entirely round the instrument, is about 18 feet in length, 12 to 14 inches deep, and 1 inch thick, and is a perfectly designed piece of work in itself. It is made of multi-ply plywood, as many as nine or more plies being used. Inside the outer rim and on the lower side is a narrow one, the same thickness as the outer but about one-half the depth, the purpose of this being to give additional strength to enable the case to take the weight of the iron frame.

Belly or sounding board.—The wood used for the sounding board, frequently called "bellywood" or "Swiss pine" in the trade, is mountain pine imported from Rumania, Czechoslovakia, Switzerland, and other parts of central Europe. For the cheaper pianos, however, Quebec spruce and Sitka spruce are both largely used. Owing to the large supplies available, which were brought over for airplane construction but not passed by the builders' inspectors, the use of the latter variety has considerably increased since the war.

Action parts.—The manufacture of action parts, such as balance rail, damperhead, regulating buttons, and other parts of the mechanism connecting the wires and keyboard, is a separate branch of the piano industry and is not undertaken by the instrument makers, these parts being purchased ready-made by them. French hornbeam and hard maple, both the American and European varieties, are the principal woods used. For the hammer shank Spanish cedar, hard maple, and English beech are all used, while the head is of mahogany covered with felt.

Keyboard.—Keyboards, like action parts, are also made by firms who specialize in their manufacture. The keys are largely of basswood covered with ivory or composition, only the white or sap wood being used for this purpose. Other woods used are sycamore and north European pine, while the black keys are of stained pearwood.

Wrest planks.—The wrest plank, or that part of the piano into which the tuning pins are sunk, is either of native beech or hard maple, considerable quantities of the latter being imported from the United States. As in the action rails, only the white winter-sawn wood is used in the more expensive instruments.

Other parts.—Other wood parts include the key bottom, for which north European pine, native beech, or Canadian birch are employed; back and bracing of sounding board, Quebec or Sitka spruce; while for the frame bottom board to which the pedals are fixed a variety of hardwoods are used, but principally Canadian birch.

STRINGED INSTRUMENTS

Stringed instruments, such as violins, violas, violoncellos, and double bass, are custom built in Great Britain. The reason for this, according to a leading manufacturer, being that for ordinary instruments it is impossible to compete with those imported from Germany, where their manufacture has been a national industry for many years.

The principal woods and the parts for which they are used in first-class instruments are as follows:

"Swiss" pine.—Table, breast or belly, base bar to strengthen table found on left-hand interior side of case, end and corner blocks inside linings used to strengthen ribs, and sound post.

European sycamore and maple.—Ribs, back, neck, scroll, inside linings.

Ebony.—Finger board, saddle, pegs, button and tailpiece, and bow nut.

Rosewood.—Used for same purposes as ebony except for tailpiece.

Maple.—Bridge.

Pernambuco or Brazil wood.—The bow.

In addition to the above parts, a violin has a very narrow inlay of about $\frac{3}{16}$ inch on both the back and front, usually composed of three equal widths of veneer, the two outer ones being of ebony and the middle of any white hardwood.

TALKING MACHINES

Talking machines, generally called "phonographs" or "gramophones," are extensively used in Great Britain and their manufacture is an important industry. Mahogany, oak, and walnut are principally used for the cases, the oak generally being solid and the other two of veneer. The same woods are used for the cores as for piano cases.

WOOD WIND INSTRUMENTS

For wood wind instruments, such as the piccolo, flute, oboe, and clarinet, cocus wood is preferred, but rosewood and ebony are also used to some extent.

ORGANS

Oak is the favorite wood for organ cases, although walnut is sometimes used. The pipes are made of both metal and wood; when the latter, they are usually of Canadian white pine and, to a small extent, mahogany.

For the sounding boards and keyboards, the same species are used as in pianos, and they are described fully under that heading.

SPORTING AND ATHLETIC GOODS

The value of the output of sporting and athletic goods, billiard tables and accessories, including repair work, during the year 1924, was £3,374,000. Included in this total are tennis, golf, and balls of other descriptions to the value of £800,000.

The average number of persons employed during the year 1924 at the factories to which the foregoing figures relate was 7,406, of whom 6,375 were operatives and 1,031 belonged to the managerial, clerical, and technical staff, according to the census of production of that year.

Sporting and athletic goods are manufactured not only for domestic use but an important export trade is done, particularly to the Dominions, Australia and South Africa both taking large quantities of cricket goods.

The principal sports from a wood-using point of view are cricket, golf, tennis, and field hockey, and, to a lesser extent, bowls, croquet, lacrosse, and polo.

CRICKET

Up to the present time the only wood that has been found suitable for cricket bats is willow, of the variety known as *Salix alba* var. *caerulea*, grown in certain sections of England, and only wood from the female or close-barked tree can be utilized.

Great care is exercised in selecting the wood, the best bats being made from white (sap) wood, free from stains, butterfly marks, and knots, and with a straight grain, preferably ¾ inch or upward to 1 inch in width. The tree should be at least 15 years old and should have a minimum circumference of 54 inches breast high. After felling, the logs are cut into lengths of about 30 inches and then split, not sawn, along lines radiating from the center. The bark is stripped off to prevent discoloration and the set removed; the resultant piece is called a "cleft." The depth of the cleft naturally depends upon the size of the tree, but the width should be not less than 5 inches at the wide part. These clefts are seasoned for about 18 months before being made into bats. Some manufacturers, however, prefer to buy willow in logs or even standing timber.

The supply of the cricket-bat willow, however, has been very seriously curtailed owing to the presence of what is known as the "watermark" disease, which has caused serious losses to those engaged in the cultivation of this willow. A general symptom of this disease, according to W. R. Day, mycologist, Imperial Forestry Institute, Oxford, is a dying back of the crown, which begins during the late spring. Even in the first year of attack a tree is so affected as to lose much of its value as timber; and such is the progress of the disease that within one or two years trees become a total loss.

It is unknown at present whether American willow is suitable for the manufacture of cricket bats, but, as a result of the steadily growing shortage of native timber, there would appear to be an excellent opportunity for its sale provided stock can be furnished having similar qualities to the native wood. Only the blade of a cricket bat is made of willow, the handle, which is spliced to the blade, being made of Sarawak cane split into four or six pieces and intersected with rubber, the whole being glued together and bound with thread.

Next in importance to willow for the bats, is ash for the wickets and bails. These must be of perfectly straight grain, otherwise they would break when hit by a swift-traveling ball. English and American ash is used for this purpose, the native-grown wood being preferred.

GOLF

From a wood-using point of view golf is the most important sport as far as the United States is concerned. No wood has been found equal to hickory for shafts or to persimmon for heads, the entire needs being imported from the United States.

Shafts are imported either as squares or in dowel form, the usual lengths being 40, 44, and 46 inches; the white or sap wood is preferred, but it is usual to accept a certain percentage of red or heart wood. One reason why the white wood is preferred is that clubs made from it may have a natural finish whereas shafts showing red wood must be stained. Before being finished they are kiln dried and great care is taken to prevent reabsorption of moisture. The most important qualification for golf shafts is that they be straight grained and return to a straight line after bending.

Models of club heads have a tendency to increase in size and are considerably larger than those formerly used.

In the early days of golf when solid gutta percha balls were used, heads were generally of beech, faced with leather, to absorb the shock. Later, for a short time, dogwood was used; but both have been almost entirely superseded by American persimmon on account of its ability to withstand the shock of a blow without splitting or splintering. Persimmon heads are made entirely from sapwood and are generally imported in the rough block. Some few manufacturers of clubs, however, still prefer to cut their own material from imported logs, but they represent only a small part of the industry.

Up to the present time steel shafts have not been permitted under the rules of the Royal and Ancient Golf Club of St. Andrews, Scotland, the governing body for golf in the United Kingdom, so that there has been no demand for them. It is thought by some golf-club manufacturers, however, that they will be permitted before very long and that there will be a consequent curtailment in demand for hickory shafts.

TENNIS

The frames or bows of tennis rackets are generally cut from bends, also a few may be rent. They are made of both native and American ash, the native variety being preferred on account of its great toughness and also because it is a good selling point. Many racket manufacturers do not make their own bends but buy them ready-made from firms who make a specialty of that business. It is essential that the wood be thoroughly dry, and bends are usually seasoned for a year or longer before being used.

The handles, like those of cricket bats, are spliced; they are of Sarawak cane intersected with rubber and glued. A variety of woods are used for handle grips, Spanish cedar and mahogany being the most popular, while for the wedge or throat of the racket mahogany, walnut, sycamore, and elm are all used.

Net posts are of ash in most cases, although in some of the cheaper ones beech is used.

HOCKEY

Since the war the game of hockey has greatly increased in popularity, especially among schools and colleges for girls. Hockey sticks are made from ash bends, while the handle is of Sarawak cane.

BILLIARDS

Oak and mahogany are chiefly used for the frames of billiard tables while for cues ash and maple, let in with ebony, or rosewood to give balance, are generally used. The value of the output of tables, parts and accessories, and repair work was £574,000 during 1924, according to official statistics. The manufacture of billiard tables and requisites, however, is a highly specialized business and is in the hands of a very few firms.

BOWLS

The game of bowls, played on a bowling green and not to be confused with American bowling, is very popular in Great Britain, most parks being equipped with public greens. The bowls are elliptical in shape and are weighted to give a bias. Lignum-vitæ from Santo Domingo is used exclusively for them, no other species having been found suitable.

OTHER SPORTS

For the manufacture of gymnastic apparatus beech and hard maple are largely used, while beech, sycamore, and boxwood are all used for croquet mallets and ash is used for the handles. Lacrosse and polo, while indulged in by comparatively few persons, also need wooden equipment, the lacrosse frame being made of ash, while polo mallets have ash heads and rattan handles. The balls are made either of bamboo root or willow.

Fishing tackle, to the value of £179,000 was produced during 1924 in Great Britain, rods accounting for the larger part. The more expensive of these are made of split bamboo with a steel rod center, while the less expensive ones are of greenheart.

TEXTILE MACHINERY

The manufacture of textile machinery is an important industry in Great Britain, the principal plants being located in the Lancashire and Yorkshire districts. In addition to making machinery for the home textile industry, an extensive export business is done. During 1925, according to official statistics, British exports of textile machinery amounted to 120,926 long tons, valued at £11,729,034.

While the quantity of lumber used is comparatively small, in the aggregate it is of considerable importance to the lumber industry.

PRINCIPAL WOODS USED

Most of the wood used in textile machinery is for small parts, the principal species and the purposes for which they are used being as follows:

Canadian white pine.—Principally for framework, weavers' beams, trough lids, and reed frames.

Red cypress.—Spinning frame troughs.
Mahogany.—Spindle covers, automatic spread board rollers, and trough lids.
Finnish birch.—Thread spools and bobbins.
Canadian birch.—Looms and feeding lattices for cards, thread spools and bobbins, and rollers.
Hickory.—Picker sticks.
Persimmon.—Loom shuttles.
Dogwood.—Loom shuttles and bobbins.
Yellow poplar.—Yarn drying frames, dye rollers, and cloth beams.
Maple (hard).—Bobbins and rollers.
Teak.—Framework and trough lids.
Spanish cedar.—Ring frames (old type).
Lignum-vitæ.—Cotton gins and polishing sticks.
Boxwood.—Small parts and turned parts, spinning frame bosses or rollers.
Lancewood.—Small parts and turned parts.
Satinwood.—Spinning frame bosses.
Douglas fir.—Weavers' beams and cloth beams.
Native beech.—Looms (lathe strips) and turnery in general.
Native alder and sycamore.—Turnery and rollers.
Native poplar.—Small parts.

SHUTTLES

American persimmon and dogwood are principally used for loom shuttles, usually being imported rough shaped, in sacks, and finished in the United Kingdom. The principal sizes of the rough blocks are as follows: 15½ and 14½ inches by 1⅞ by 1⅝ inches; 13½ and 12½ inches by 1¾ by 1⅜ inches; and 13½ inches by 1¾ by 1¾ inches. Owing to the high speed at which they travel dogwood shuttles are always used in cotton mills, while for jute and wool the shuttles are made of persimmon.

Formerly persimmon and dogwood logs were imported and cut up in Great Britain, but this method has been found wasteful and too expensive, so it has been practically abandoned and only very occasional shipments have been received during recent years. The manufacture of shuttle blocks is specialized in by several American firms and it is largely as a result of their enterprise that the large trade in them with Great Britain has been built up.

For some particular purposes, such as shuttles in silk looms, boxwood is used, but because of the high value of this wood dogwood is frequently substituted. The Abasian boxwood (obtained from the Trans-Caucasian district of Russia, on the Black Sea) is preferred, but its scarcity causes the South African (Knysna) variety to be generally employed.

The manufacture of shuttles is largely in the hands of a few firms, who make a speciality of them, located in the textile districts of Lancashire and Yorkshire.

PICKER STICKS

Next to shuttle stock the most important American wood used in the textile industry is hickory, for the manufacture of the levers known as pickers used in a weaving loom to give motion to the shuttle. These picker sticks are imported in rough squares 1½ by 1½ inches and 1⅝ by 1⅝ inches by 24, 26, and 28 inches long.

In addition to the squares, a small quantity of picker sticks are made from imported hickory logs, the northern variety being preferred.

FRAME ROLLERS AND BOSSES

American hard maple is largely used for drawing or roving frame rollers and is imported, as a rule, in octagonal blocks 6½ to 10 inches in diameter, 24 to 36 inches long. Boxwood is used when available but it is now practically unobtainable in the sizes desired.

An exceptionally high grade is required and the blocks must be free of heart centers and all other defects. These blocks are sawn into the rough size of the rollers on arrival and seasoned for a long period before being turned. Great care is taken during the seasoning period, the stock being turned over every few months to ensure even drying.

Both West Indian and Abasian boxwood (the latter being preferred) are used for spinning frame bosses. During October, 1927, the landed value of the former variety was approximately £7 10s. to £10 per ton and the latter £15 to £20. A small amount of satinwood is also used for this purpose. These bosses or small rollers run from 1⅞ to 4½ inches in diameter by ½ to 1¼ inches thick. Before being used these rollers are steeped in linseed oil for a period of six months or longer.

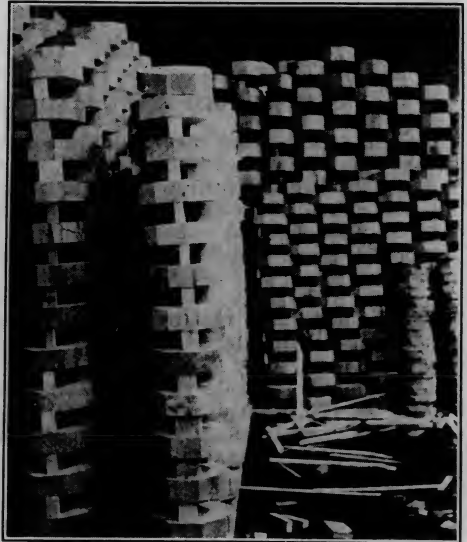


FIG. 42.—American hard maple in first stage of manufacture into drawing or roving frame rollers in Belfast linen mills

BEAMS

Until the past few years Canadian white pine was used almost exclusively for weavers' beams. However, its high cost caused other suitable species to be sought with the result that a steady demand is now in evidence from the Lancashire district for Douglas fir squares, 4, 4¼, 4½, 4¾, 5, and 5¼ inches being mostly called for. In addition American yellow poplar is sometimes used, the beams being cut from imported logs. The cloth beam, on which the woven fabric is wound, is usually made of Douglas fir.

TROUGHS

The Belfast linen industry is of particular interest to American lumber exporters in view of the fact that Louisiana red cypress is extensively used for the construction of spinning frame troughs.

Red cypress.—Spinning frame troughs.
Mahogany.—Spindle covers, automatic spread board rollers, and trough lids.
Finnish birch.—Thread spools and bobbins.
Canadian birch.—Looms and feeding lattices for cards, thread spools and bobbins, and rollers.
Hickory.—Picker sticks.
Persimmon.—Loom shuttles.
Dogwood.—Loom shuttles and bobbins.
Yellow poplar.—Yarn drying frames, dye rollers, and cloth beams.
Maple (hard).—Bobbins and rollers.
Teak.—Framework and trough lids.
Spanish cedar.—Ring frames (old type).
Lignum-vitæ.—Cotton gins and polishing sticks.
Boxwood.—Small parts and turned parts, spinning frame bosses or rollers.
Lancewood.—Small parts and turned parts.
Satinwood.—Spinning frame bosses.
Douglas fir.—Weavers' beams and cloth beams.
Native beech.—Looms (lathe strips) and turnery in general.
Native alder and sycamore.—Turnery and rollers.
Native poplar.—Small parts.

SHUTTLES

American persimmon and dogwood are principally used for loom shuttles, usually being imported rough shaped, in sacks, and finished in the United Kingdom. The principal sizes of the rough blocks are as follows: 15½ and 14½ inches by 1⅞ by 1⅝ inches; 13½ and 12½ inches by 1¾ by 1¾ inches; and 13½ inches by 1¾ by 1¾ inches. Owing to the high speed at which they travel dogwood shuttles are always used in cotton mills, while for jute and wool the shuttles are made of persimmon.

Formerly persimmon and dogwood logs were imported and cut up in Great Britain, but this method has been found wasteful and too expensive, so it has been practically abandoned and only very occasional shipments have been received during recent years. The manufacture of shuttle blocks is specialized in by several American firms and it is largely as a result of their enterprise that the large trade in them with Great Britain has been built up.

For some particular purposes, such as shuttles in silk looms, boxwood is used, but because of the high value of this wood dogwood is frequently substituted. The Abasian boxwood (obtained from the Trans-Caucasian district of Russia, on the Black Sea) is preferred, but its scarcity causes the South African (Knysna) variety to be generally employed.

The manufacture of shuttles is largely in the hands of a few firms, who make a speciality of them, located in the textile districts of Lancashire and Yorkshire.

PICKER STICKS

Next to shuttle stock the most important American wood used in the textile industry is hickory, for the manufacture of the levers known as pickers used in a weaving loom to give motion to the shuttle. These picker sticks are imported in rough squares 1½ by 1½ inches and 1⅝ by 1⅝ inches by 24, 26, and 28 inches long.

In addition to the squares, a small quantity of picker sticks are made from imported hickory logs, the northern variety being preferred.

FRAME ROLLERS AND BOSSES

American hard maple is largely used for drawing or roving frame rollers and is imported, as a rule, in octagonal blocks 6½ to 10 inches in diameter, 24 to 36 inches long. Boxwood is used when available but it is now practically unobtainable in the sizes desired.

An exceptionally high grade is required and the blocks must be free of heart centers and all other defects. These blocks are sawn into the rough size of the rollers on arrival and seasoned for a long period before being turned. Great care is taken during the seasoning period, the stock being turned over every few months to ensure even drying.

Both West Indian and Abasian boxwood (the latter being preferred) are used for spinning frame bosses. During October, 1927, the landed value of the former variety was approximately £7 10s. to £10 per ton and the latter £15 to £20. A small amount of satinwood is also used for this purpose. These bosses or small rollers run from 1⅞ to 4½ inches in diameter by ½ to 1¼ inches thick. Before being used these rollers are steeped in linseed oil for a period of six months or longer.

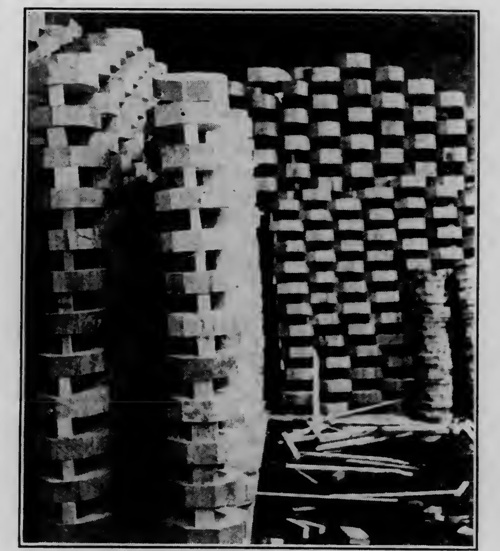


FIG. 42.—American hard maple in first stage of manufacture into drawing or roving frame rollers in Belfast linen mills

BEAMS

Until the past few years Canadian white pine was used almost exclusively for weavers' beams. However, its high cost caused other suitable species to be sought with the result that a steady demand is now in evidence from the Lancashire district for Douglas fir squares, 4, 4¼, 4½, 4¾, 5, and 5¼ inches being mostly called for. In addition American yellow poplar is sometimes used, the beams being cut from imported logs. The cloth beam, on which the woven fabric is wound, is usually made of Douglas fir.

TROUGHS

The Belfast linen industry is of particular interest to American lumber exporters in view of the fact that Louisiana red cypress is extensively used for the construction of spinning frame troughs.

Although experiments have been made with various other woods, none so far has been found its equal for this purpose.

These troughs must be absolutely watertight and made from a wood that will not impart any color to the yarn. As they are continuously being filled with steam and water at a high temperature, no joints can be used in their construction, neither are knots admitted in the lumber.

"Prime" quality lumber is usually purchased by importers catering to this trade, the following specifications being the most general: 1 by 17 to 23 inches, averaging 21 inches, 50 per cent of the pieces 18 feet and 50 per cent 20 feet long; and 1½ by 8 inches and wider, averaging 12 to 13 inches, in the same lengths.

While cypress has been found ideal for those parts of the trough that are continually wet, it is not considered suitable for the lids or tops on account of their being alternately wet and dry, and, for that reason, other woods, such as Canadian white pine and mahogany are generally used.

THREAD SPOOLS AND BOBBINS

Birch is used almost entirely for thread spools and bobbins. It is imported from Finland and Canada, the white variety being preferred in the form of small squares and finished in this country. For full particulars as to the dimensions of these squares, see under heading "Spool wood" in the birch section under the heading "Principal woods used."

AIRPLANES

Of all woods used in Great Britain those used in airplane construction are of the highest quality and are subjected to the severest inspection.

Excluding those made in Government factories, airplanes to the number of 700, valued at £1,234,000, according to the census of production, were manufactured during 1924. The principal commercial factories are at Bristol, Southampton, Edgeware, Leeds, Hayes, Weybridge, and Coventry.

Owing to the development of the all-metal plane, purchases of wood have been greatly reduced during the past few years and are relatively small compared with the quantity bought during the war and immediately after, most of the current needs being supplied from stocks on hand. However, although there is a tendency toward the all-metal plane, it has not yet been definitely established whether they have any great advantages over those of wooden construction for commercial purposes. Both the American planes *Spirit of St. Louis* and *Columbia* which made trans-Atlantic flights during the summer of 1927 were built of wood.

PRINCIPAL WOODS USED

Sitka, or "silver" spruce (*Picea sitchensis*), as it is commonly called, from the Pacific coast of the United States and Canada is the principal wood used in airplane construction. Because of its lightness combined with strength, resiliency, and flexibility, and because of the accuracy with which it can be worked, it is preeminent for framework and is almost exclusively used for spars, struts, and leading edges.

Sitka spruce for airplane construction is imported kiln dried and rift sawn, the usual specification being 3 to 6 inches thick by 6 inches and wider, 18 to 40 feet long with 10 to 15 per cent 10 to 17 feet admitted. A very superior grade of No. 2 clear and better is used and is selected piece by piece after the severest tests by the airplane builders' inspector. The lumber not only must be free of knots and other defects but great attention is paid to the grain, which must be of the close, fine type and must be absolutely straight from end to end, cross, curly, or coarse grain being unsuitable for airplane work.

In the early days of airplane construction West Virginia spruce (*Picea rubra*) was used but has been superseded by Sitka for some years.

Next in importance is ash, used for longerons and other parts requiring strength, toughness, and elasticity. Of all the species the native timber is considered the best for airplane work This wood is very carefully selected and must be free from any cross grain. It is customary for construction companies to purchase ash in the log, cut through and through, seasoned for approximately one year to the inch. When cutting these planks into the required parts, care is taken that the piece shall have two of its sides parallel with the medullary rays; otherwise the shrinkage may cause alteration in the shape which would in turn disorganize the fittings.

American black walnut or Honduran and Nicaraguan mahogany are the woods chiefly used for making propellers, but for this purpose black walnut has no superior. The propellers are built up in laminations from straight-grained wood, preferably quarter sawn, because lumber sawn in this manner retains its shape better, shrinks less in width, and takes glue better, enabling a superior joint to be obtained. In the early days of airplane construction in Great Britain, French walnut was exclusively used for propellers for no particular reason except that it was well known and plentiful and considerably used in that country. It does not, however, possess the qualities of American black walnut and has now been entirely superseded by the latter. Mahogany is sometimes used for seaplane floats, these being laminated from thin boards. During the war experiments were also made with red cypress for propellers, but it was found unsuitable, and some of the stock imported at that time is still stored in importers' yards.

Birch is used chiefly in the form of plywood and is manufactured in the United Kingdom out of imported Canadian logs, white birch being preferred. It is used chiefly for the fuselage of airplanes and seaplanes and for the floats of the latter also. In order, however, to prevent its absorbing moisture it is constantly varnished, otherwise additional weight will be taken up in the form of water. Other uses of plywood is the building up of wings, ribs, spars, tank coverings, partitions, and instrument boards.

Among other woods used in airplane construction may be mentioned yellow poplar for instrument boxes and fittings; also the lighter fancy hardwoods for interior finish.

The adoption of the all-metal plane has developed a market for a wood heretofore little known in Great Britain, namely balsa. This peculiar wood is extraordinary light in weight, being approximately one-half that of cork, and is now being used for filling up the tubular construction parts of metal planes. With the development of the metal the demand will probably increase. Apart therefore from this species it may reasonably be taken for granted that the demand for wood for airplane construction will continue to decrease until it ceases to be a factor in the lumber market—a condition likely to be reached in the near future.

PATTERN MAKING

The white pine (*Pinus strobus*) of North America has long been a favorite wood for pattern making in the United Kingdom on account of its soft even grain, making it easy to work, and its ability to stay flat and hold its shape after working.

No statistics are available showing the quantity of pattern-making wood imported into the United Kingdom so it is impossible to give even an approximate idea of the quantity consumed for this purpose.

The principal consumers of pattern-making wood in the United Kingdom are the shipbuilding (including the British Admiralty), engineering, and railroad industries, and upon the activity of the first two largely depends the demand.

Pattern woods are handled by softwood importers who purchase their supplies through regular agents. They are located principally in the largest ports nearest these industries, such as Liverpool, Glasgow, Manchester, Belfast, and Newcastle-on-Tyne, and the woods are distributed by them to the consumers, who usually operate their own pattern shops.

CANADIAN WHITE PINE

Of the woods used for pattern making, Canadian white pine, or "Quebec yellow pine" as it is called in the United Kingdom, has the largest sale. It has been used for very many years and is firmly established. Pattern makers assert that patterns made of this species retain their shape and can be used over and over again. The specifications usually called for are first, second, third, and fourth quality deals, 3 by 7 inches and wider; first, second, and "unsorted" (first, second, third, and fourth, averaging third) quality sidings, 1, 1¼, 1½, and 2 by 7 inches and wider, and hewn wany timber. Some Canadian exporters put up special grades of their own which are well known to the trade. This timber is imported hewn on all four sides with a heavy wane on each corner, and sold as "wany pine." A usual specification runs from 15 to 36 feet in length by 15 to 24 inches deep. When very wide boards, or a thickness greater than 3 inches, or long lengths are required, wany pine logs are purchased and cut into the desired dimensions in the consumers' own shop. The quantity of logs used, however, forms a very small part of the total.

OTHER SPECIES

Other species used for pattern making are California sugar pine, western white pine, Port Orford cedar, and Siberian and east Asiatic kedar (a soft pine). These are gradually gaining a foothold as a substitute for Canadian white pine, but so far, with the exception of the Manchurian or Siberian kedar, without much success, the British trade preferring the expensive Quebec white pine. A little Central American mahogany is also used for special patterns.

PROSPECTS FOR AMERICAN WOODS

Although Canadian white pine is still the favorite and most used wood in the United Kingdom for pattern making, it is becoming scarcer and more expensive and substitutes may eventually supplant it.

The United States, as the principal producer of other suitable species, will probably find its sales of these species slowly increasing but, in any event, the total quantity of lumber consumed by the pattern-making industry is comparatively small.

The final decision as to what species shall be used in the pattern shops of the large shipbuilding, engineering, and railroad companies is largely in the hands of the works manager and unless his approval is gained other factors carry little weight. White pine has been used for so many years that great difficulty is always experienced in getting users to consider any other species—even when there is a material price differential in its favor.

COFFINS

Oak and elm are chiefly used for the better kind of coffins in Great Britain, the cheaper one being made to a considerable extent of American sap gum, or hazel pine, as it is called, while those used for the very poor are made out of any cheap wood finished to resemble the more expensive species. An interesting development in this respect has been a process whereby ordinary cheap wood is made to resemble oak or other species desired by means of a transfer.

In discussing the different woods used in the manufacture of coffins it must be understood that only the tops and sides are referred to, sap gum or almost any inexpensive wood generally being used for the bottoms.

English, American, and Japanese oak are all used, no difference being made between them by the coffin manufacturers. The American and Japanese lumber, however, while having a higher first cost, is preferred on account of its being graded and sawn square edged, unlike the native, which is obtained by sawing logs through and through and sold ungraded.

The United States furnishes both red and white oak of the northern and southern varieties for coffin manufacture in the United Kingdom, the majority coming from the Southern States. For some unexplainable reason certain sections prefer the white oak, while in others the red is more often called for.

The grade known as "prime coffin" is imported in thicknesses of ⅝, ¾, and 1 by 12 inches and wider, the quantity of 12-inch boards usually being limited to not over 10 per cent of the total number of the pieces shipped. As great a proportion of 17-inch and wider boards as possible are desired, not less than 25 per cent of the total pieces generally being required by the buyer, these being used for lids, while the narrower boards are for the sides. The usual lengths are 12 feet and longer, not over 10 per cent of the pieces may be 12 feet but any number of pieces 6 feet 6 inches and 7 feet may be included, as they are the lengths most used and entail the minimum of waste.

Southern elm in the same specification as oak is also imported in small quantities from the United States. Elm from native sources furnishes most of the stock used for coffins of the less expensive kind, it being one of the most common species indigenous to Great Britain. It is used both ¾ and 1 inch thick, depending upon the price of the coffin.

Native elm and oak lumber is obtained by sawing logs through and through, which are sold log run to the coffin manufacturers. By this method many of the boards obtained are defective and considerable waste takes place in the factory.

The boards obtained by this method of sawing are generally wider at one end than the other; in other words, they taper. This irregularity of width, however, is not objected to by the coffin manufacturers as, by making use of the taper, the amount of waste lumber is materially less than when regular lumber with parallel edges is used. A taper of not over 2 inches is ordinarily allowed on boards used for sides, a usual specification being 14 to 12 inches, 15 to 13 inches, and 16 to 14 inches. Tops may taper even more, a usual specification being 26 to 23 inches or 22 to 18 inches in width.

In measuring tapered lumber, the width for the purpose of calculating the sale contents is taken in the middle of the piece. The boards are sold to the coffin manufacturers sawn on one or both edges; in either event the saw cut is parallel to the side of the log so as to take full advantage of the extreme width, but in most cases the lumber is simply sold as it comes from the log with the wane left on.

Canadian elm is also used to a small extent, being imported either as lumber or logs which are cut into lumber on arrival.

In addition to the species mentioned, occasionally coffins are made of North Carolina pine, but it is not considered as good as either oak or elm, and it is more expensive than the species generally used for the cheaper coffins.

PLYWOOD AND VENEER

PLYWOOD

Owing to the high cost of producing plywood in Great Britain it can not be manufactured except for special purposes, the chief of which is for the construction of seaplane bodies, gondolas for airships, and ordinary airplane fuselages. Canadian birch is used largely for this purpose, the north European variety not being large enough or sufficiently free from defects to make the sizes required. To a lesser extent mahogany is also used, but the greater proportion is birch.

The plywood used for this purpose is of exceptionally large size, sheets as large as 8 feet wide by 60 feet long and ⅛ and ⅜ inch thick being manufactured. In addition to being cemented with a special glue in the ordinary manner it is also stitched with linen thread, the stitching being spaced according to the strains to which it is likely to be subsequently put. When for flying boats and motor-boat hulls or other purposes where extreme smoothness of finish is desired, the stitching is countersunk below the face of the outer plys so that when varnished a surface which offers little resistance to either air or water is produced.

In the latter part of 1926 there was launched for the Air Ministry the first passenger and mail-carrying flying boat specially designed for that purpose. It had accommodations for six passengers and 1,000 pounds of mail. The hull of this boat was made of only five lengths of stitched plywood. Two lengths each 50 feet long were used for the keel, two of the same length for the sides, and one for the deck.

At a public meeting held in London to celebrate the completion of a trip from England to Australia and back it was stated that the machine used was largely constructed of plywood.

While for military purposes the all-metal plane has been adopted by the British Government, plywood is bound to retain great importance for airplane construction. Its freedom from atmospheric influences and ability to stand up under extremes of heat and cold and dryness and moisture make it a particularly suitable material for this purpose.

Not only in the fuselage is plywood used, but it also enters largely into the building up of the wings, ribs, spars, tank coverings, partitions, and instrument boards.

Plywood panels.—In addition to the plywood used for aeronautical purposes there is an important trade in the manufacture of high-class plywood panels for wainscoting, display windows of stores, railroad passenger and Pullman cars, trolley cars, flush-surfaced doors, and table tops, the use of veneer giving an opportunity for matched panels and wood decoration obtainable in no other way. These are made by applying a veneer of mahogany, oak, or walnut on a core of some less valuable plywood, such as north European birch, alder, okoumé, or sometimes Douglas fir. Okoumé, however, is seldom used except for mahogany veneer. Domestically made panels are seldom used in stock sizes but are generally ordered to special dimensions to fit the particular job for which they are required.

The manufacture of plywood panels is sometimes undertaken by the larger furniture and talking-machine manufacturers themselves, sound wormy chestnut being favored by some for the core.

Metal-faced plywood.—There has been on the British market for several years a plywood having a metal sheet on both faces. The increased strength thus obtained and resistance to fire make it particularly suitable for many purposes, especially for fireproof curtains or doors, partitions, panels, motor-cycle side cars, and light commercial vehicle bodies. While the demand is not of great proportions at present, there would seem to be a wide field for this kind of plywood in Great Britain provided its price does not prove prohibitive.

VENEER

The British veneer industry has been established for many years and has reached a high standard of excellence. It is principally occupied with the manufacture of fine veneers such as mahogany, oak, and walnut, although many fancy woods, such as sycamore, satinwood, and sabicu are made to meet individual desires.

In addition to the fancy hardwoods, there is also made a small quantity of American yellow poplar veneer out of imported logs, this species being much esteemed as a base on which the other veneers are laid.

While no statistics are available, it is estimated that a total of about 80,000,000 feet of veneer of all kinds is produced each year.

Methods of production.—The rotary, sliced, and sawn methods of manufacture are all used, the latter principally for curl veneers and those made from the denser hardwoods.

The slicing method is generally used on account of its giving an opportunity for showing the quarter figure, while the rotary method is seldom employed except for the production of veneers used in the construction of plywood, where wide widths and long lengths are required.

Principal uses.—In addition to panels of all descriptions the use of veneer enters into the construction of high-class furniture, piano and other musical instrument cases, talking-machine and radio cabinets.

Marquetry, or inlaid work of ornamental woods, is another use in which veneer is used in the decoration of furniture and offers an opportunity for utilizing small pieces of fancy veneer. For cigarette and other small boxes, fancy baskets, and also for the mending of larger panels, small pieces of high-class veneer find a steady outlet.

RADIO CABINETS

According to official information, the number of radio receiving licenses issued by the post office, in force at the end of September, 1927, was 2,333,631. In addition, there were 9,150 blind listeners to whom free licenses had been granted. These figures show an advance on the previous month's total of nearly 18,000.

The manufacture of radio cabinets is, both by those who make the equipment and by independent firms, largely to meet the demand from individuals who prefer to make their own receiving sets. Mahogany, oak, and, to a smaller extent, walnut are the most popular woods, and the same are used for talking machines. The sliding baseboard, to which are attached the component parts, is also of wood, American yellow poplar being largely used for this purpose.

The great increase in the number interested in radio has been of considerable value to the manufacturer of ready-cut cabinets, largely purchased by the amateur who wishes to build his own set, and the sale of these has already gained a firm foothold.

As an outlet for short lengths of lumber, the manufacture of radio cabinets may prove an important factor. Few pieces longer than 2 feet are needed, and many shorter ones for ends are used. A popular ready-made radio cabinet now being sold in Great Britain is of African mahogany 1 inch thick, and is made as a side line by a furniture manufacturer out of short lengths that accumulate in excess of his regular requirements.

Female labor is used to a large extent in these factories, much of the work—such as gluing, polishing, and wrapping—being easily done by unskilled labor. The knock-down parts are carefully protected from damage during shipment by each piece being wrapped in tissue paper and the whole packed in a corrugated fiber container. Instructions for assembling are inclosed in each package.

Cabinets of all sizes are on the market, one of mahogany 9 by 9 by 18 inches retailing for 28 shillings.

PENCILS

The manufacture of pencils, penholders, pencil leads, and crayons has made remarkable progress since pre-war days in Great Britain and there are now many first-class up-to-date factories which not only supply the needs of this market but do an extensive export business also.

During 1924 the value of the output of the factories whose returns were made under the census of production was £454,000, as compared with £53,000 in 1907. Of the total manufactured in 1924, the exports were valued at £165,000, while during the same year there were imported £199,000 worth, chiefly from the United States, Germany, and Czechoslovakia.

British subsidiaries of American pencil manufacturers may be said to largely dominate the market, their use of patented machinery belonging to the parent company and their control of wood supplies placing them in an unassailable position.

Practically all the wood used for the manufacture of pencils and penholders in Great Britain is either aromatic red cedar or incense cedar, both obtained from the United States, the former predominating and being used exclusively for the better quality of pencils. Efforts are, however, now being made to supplement the existing supplies by imports of cedar from Kenya Colony, East Africa. This wood is a very good substitute for the American varieties, and when the difficulties of manufacture and shipping are overcome imports are likely to increase, but so far they have been of little importance.

Pencil cedar is imported in the form of slats, the usual size being 7¼ by 2¼ by $\frac{3}{16}$ inch, each slat, as a rule, being of a width to make six pencils. They are imported either in bags, crates, or cartons, the bags and cartons usually containing 25 gross, while the crates contain 100 gross. The first-named container, however, has many advantages, such as saving in transportation charges and ease of handling. It might be thought that the packing in bags would result in considerable loss through breakages, but experience has not shown this to be the case.

MINING

In addition to pit props, and mining timber and ties, which have been covered in another section, the mines of the United Kingdom use considerable quantities of timber for structural work at the pit heads and shafts where long lengths and strength are required. Southern pine and Douglas fir are both used, and the demand for the latter is increasing.

IMPORTS OF WOOD MANUFACTURES

In spite of the high development of the woodworking industries, there are still certain products and articles that can not be economically manufactured in the United Kingdom which are imported ready-made. Closeness to supplies of raw material, development of mass-production methods, cheapness of labor, and in many of the European continental countries depreciating currencies since the war are all factors enabling these particular items to be imported at a less price than it is possible to manufacture them in the United Kingdom.

For certain of these imports, such as plywood and builder's woodwork (chiefly doors), the demand is steadily developing, while in other lines it is very doubtful if any increase is taking place. The value of imports of wood manufactures into the United Kingdom over a period of years is shown in the following statement:

1913	£3, 583, 187	1922	£3, 808, 525
1919	4, 309, 807	1923	4, 584, 588
1920	8, 630, 915	1924	5, 370, 727
1921	4, 921, 864	1925	6, 226, 350

CHARACTER OF IMPORTS

Plywood, builder's woodwork, furniture, and cabinet ware are the items composing the largest part of these imports, the balance being made up of household woodenware, tool handles, and a great variety of miscellaneous wood products imported either in a finished or partly finished form.

The following statement shows the distribution and value of imports of wood manufactures during the year 1925:

Plywood	£1, 446, 653	Tool handles	£230, 337
Builder's woodwork	1, 087, 116	All other	2, 540, 603
Furniture and cabinet ware	668, 821	Total	6, 226, 350
Domestic woodenware	252, 820		

BUILDER'S WOODWORK

Since the armistice over 1,000,000 houses have been built in the United Kingdom, according to official reports, of which 753,400 were built during and after 1923. This tremendous activity in the building industry has created an enormous demand for imported millwork, particularly doors, which are delivered at considerably less cost than they can be manufactured in local factories.

No figures as to the number of doors imported are given in British statistics, they being included under the general group of "Builder's woodwork" (doors, window frames, etc.) and shown in value only. The total value of these imports during five recent years was as shown in the following statement:

1922	£234, 764	1925	£1, 087, 116
1923	377, 264	1926	1, 430, 374
1924	705, 743		

The value of imports into the United Kingdom of builder's woodwork during 1925 was as shown in the following statement:

United States	£558, 641	Belgium	£16, 861
Sweden	335, 601	Italy	16, 134
Netherlands	55, 739	All other	34, 938
Germany	31, 843	Total	1, 087, 116
Austria	20, 101		
Canada	17, 258		

DOORS

"Builder's woodwork," according to careful estimates, consists of approximately 90 per cent doors (exterior, interior, garage, and cupboard) and garden gates, the balance being principally moldings, architraves, skirtings, and handrails, practically all of which are furnished by Sweden. In addition, a small quantity of ready-made sash and window frames is imported. The total number of house doors imported during 1926 was about 2,500,000.

SOURCES OF SUPPLY

United States.—The United States is the most important source of supply for British door requirements, furnishing in 1925 (the latest year for which official figures are available) about 60 per cent of the total imports. British customs entry figures for the first half of 1927 indicated that the proportion is increasing and that about 75 per cent of the total is now being received from the United States. The export of doors from the United States to the United Kingdom increased from 366,465 in 1924, the first year in which doors were shown separately in United States statistics, to 1,514,482 during 1926.

Practically all of these doors were shipped from the Pacific coast, the great majority being of Douglas fir throughout, or western hemlock stiles and rails with fir panels, the remainder being of California white pine, but it is the former that is largely used in the United Kingdom. Only kiln-dried lumber is used in their manufacture, it being dried to a moisture content suitable for the English climate.

There are several factors that have contributed to the success of Douglas fir doors in the British market, chief of which are its exceedingly moderate price and attractive appearance. It has been a source of considerable comment by many not familiar with American mass production methods as to how such a superior door can be delivered in Great Britain so cheaply. The high grade of lumber used in their manufacture, particularly its freedom from knots, has also helped their sale. Even allowing for the excellent quality and moderate price of American doors, it is doubtful if their sale would have increased to the extent that it has if the demand had not been stimulated by their having been brought to the attention of dealers, architects, and consuming industries by means of advertising in trade and professional journals, also by the wide circulation of attractive catalogues compiled by various distributors.

Until the introduction of the American door, all those imported by Great Britain were made on the "mortise and tenon" system and there was a tradition that only those so made were suitable for the

British market, owing to the custom which grew during the period when all doors were handmade.

American doors met with strong opposition at first on account of being "doweled," but their other advantages have largely overcome this opposition.

Douglas fir doors are sold in two qualities, usually designated by the mark upon them.

Sweden.—Next to the United States, the principal country furnishing this market with doors is Sweden. It is estimated that about 500,000 house doors are imported from that country each year and, in addition, a considerable number of cupboard and garage doors and garden gates, the latter at prices with which other countries so far have been unable to compete.

Swedish doors are made of kiln-dried pine and are manufactured on "the mortise and tenon" principle. This type of door is still preferred by some to the "doweled" in the British market and is a selling point not overlooked by Swedish manufacturers.

Very few Swedish doors have plywood panels, these being used only where exceptionally large-sized single panels are required and when demanded by customers, in which event a small additional charge is made. They are also manufactured with either panels, and/or rails and stiles solid or jointed.

Swedish doors have many knots in them, but as a great many of them are painted this does not constitute a defect, the wood out of which they are made taking a smooth flat finish.

Practically all Swedish factories being unionized, there is no difficulty in their obtaining a British permit, which gives them a decided advantage over doors not on the approved list.

Early in 1927, the majority of the Swedish millwork manufacturers formed themselves into two organizations for export trade, establishing equal minimum prices. The factories were grouped into three classes—A being the old established and well known, B those not so well established, and C the remainder. The minimum prices are on a sliding scale, rising or falling with the percentage of the output the particular factory sells.

The basis of sale for Swedish doors in the United Kingdom is on discounts from a standard "base" list. The "base" is for class A, B taking 2 per cent additional, while class C takes an additional 3½ per cent over the A grade.

Other countries.—Among other countries shipping doors to the British market are the Netherlands, Germany, Austria, Canada, Norway, Belgium, Latvia, Estonia, Rumania, Lithuania, and Russia; all, with the exception of the Austrian and Dutch, which are made of spruce, being made from north European pine. Of these the Netherlands is the most important, doors being manufactured in that country largely out of imported north European spruce. Canada has been unable to make much headway in Douglas fir doors but ships small quantities of white pine doors from the Atlantic seaboard.

Softwood doors from most of the other European countries are inferior in quality and finish to the American, Swedish, and Dutch products. The Austrian door is made out of central European spruce and for a time gained considerable foothold in the northwest of England. However, the largest door factory in Austria is reported to have ceased operations, and imports by early 1927 had dwindled to naught. Although Italy appears among those countries as supplying the United Kingdom with builders' woodwork, none of it originates in that country, the amount shown in British statistics for 1925 representing doors manufactured in Austria and shipped through Italian ports for convenience. The imports from Belgium consist principally of cupboard and other small doors, also small quantities of other millwork originating in Czechoslovakia, no regular house doors made in that country being shipped to the United Kingdom.

Early in 1927 a parcel of about 3,000 doors arrived from Russia. These were made of pine and had plywood panels and were of first-class quality. It is reported that they came from a factory having an estimated output of from 80,000 to 100,000 doors annually. Supplies from this source may increase.

Domestic manufacture.—Local factories are largely occupied with manufacture of doors of special design, or for ordinary stock sizes where special circumstances make it impossible to sell a stock door. Ordinary stock doors can not be made at prices that can compete with the imported article. In the House of Commons it was stated by the Minister of Health, in reply to a complaint that the London County Council were using doors marked "Made in U. S. A." on one of their housing schemes, that the lowest British tender was 12s. 4d. each, against the accepted tender of 9s. 8d. delivered on the job for the United States fir door.

KINDS OF WOOD USED

In addition to the Douglas fir, California white pine, and European pine and spruce doors, a relatively small number of hardwood doors of mahogany and oak are also used, mostly for exterior purposes and interiors of office buildings, banks, hotels, and high-class residences. Many of these doors have panels of selected figured veneer.

CONSTRUCTION AND PATTERNS

The panels of American Douglas fir inside doors of the best quality are usually made of ⅜-inch three-ply and in the second quality of ⅜-inch plywood or lumber ⅜ or $\frac{5}{16}$ inch thick. For outside doors solid panels of vertical grain lumber ⅜, ⅝, and ¾ inch thick are used, mainly ⅝ inch.

The stiles, rails, and muntins are all edge grain and in the best quality are solid. Jointed rails are used to a slight extent in the second quality, generally when the door pattern calls for a wide bottom rail, in which case Lindermann joints are used as in the panels. Most American doors are made on the "dowel" system, the joints being locked by keyed dowels ⅝ inch in diameter by 5 inches long, but there are also imported some American fir doors manufactured with a blind mortise and tenon.

Swedish pine (redwood) doors are made out of kiln-dried lumber and imported with solid panels and rails, and/or jointed panels and rails, and/or jointed panels with solid rails, the discount deducted from the standard selling list being adjusted to meet each type. The panels are either of three-ply or lumber, but comparatively few are of plywood, and only where a large panel is required or when requested by the buyer. The other European doors are of similar construction

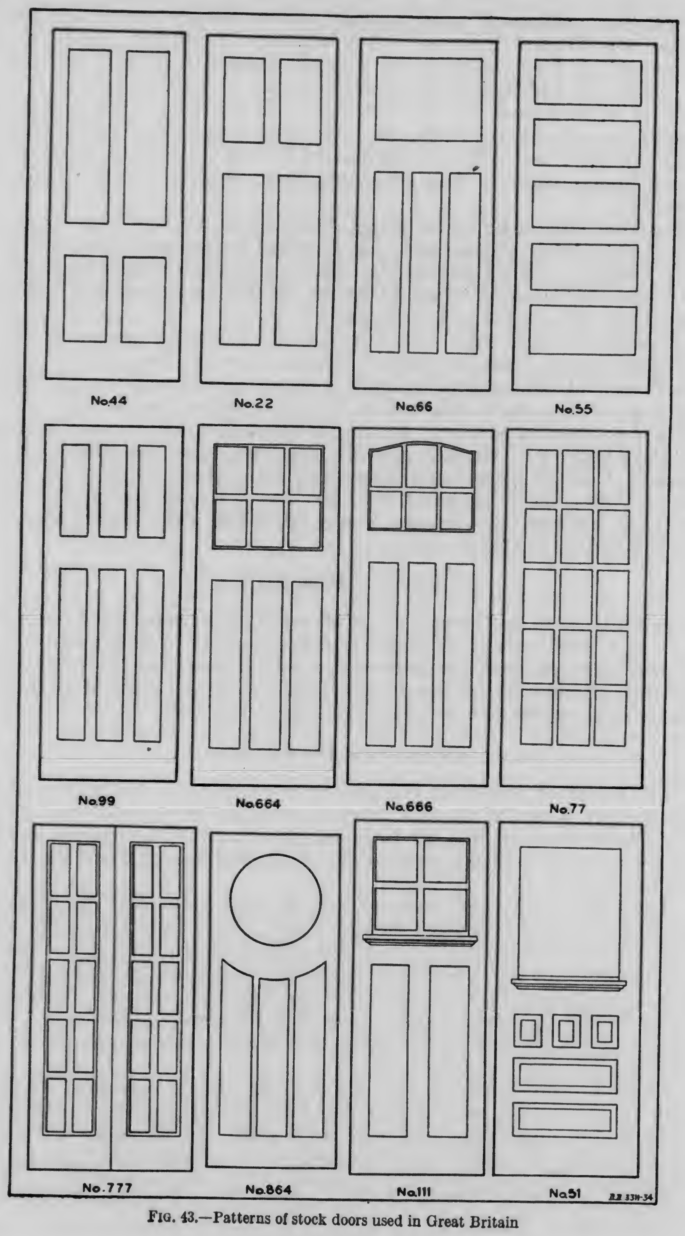


FIG. 43.—Patterns of stock doors used in Great Britain

to the Swedish, but few are equal to the first-class shipments from the United States or Sweden.

Swedish and also other European doors are all made on the "mortise and tenon" principle, the tenon being glued and wedged to give additional strength to the joints.

In order to protect the door from damage during shipment, about ¼ inch of each stile is left protruding at top and bottom, These protuberances are called "horns" in the trade. In some cases, when expensive doors are shipped, they are protected on four sides with strips and packed two to three in a crate.

Doors of many patterns are used in the United Kingdom, as will be noted from illustrations.

For interior purposes the four-panel, having two long upper and two short lower panels (sometimes the position of the panels is reversed), patterns Nos. 44 and 22, and the door having one short upper and either two or three long lower panels, pattern No. 66, are preferred. This latter is also made with the upper panel omitted so that the door may be fitted with glass.

Other patterns used, although not to such a great extent as those already mentioned, are those having five narrow horizontal panels (pattern No. 55) or three short upper and three long lower narrow vertical panels (pattern No. 99).

Front exterior doors, whether for commercial or residential buildings are of a heavier type than those used for interiors; they are often massive and generally ornamental in pattern and are usually designed by the architect in order to harmonize with the general plan of the building, and stock doors are seldom used where one is employed. The use of stock doors, therefore, is largely confined to the less expensive type of building, and many patterns are used. Of the various patterns of stock doors used for outside fronts, one having six lights in the upper panel and three vertical panels in the lower portion of the door is very popular (patterns Nos. 664 or 666). Others, known as the French single or double casement door (patterns Nos. 77 and 777), are also in popular demand, as well as pattern No. 864, which, however, can not be obtained in Douglas fir. These doors are supplied at present by Sweden, the approximate value early in July, 1927, being 17s. 6d. for the 2-foot 8-inch, 6-foot 8-inch by 2-inch, and 18s. 6d. for 2-foot 10-inch, 6-foot 10-inch by 2-inch, net, c. i. f. United Kingdom. If similar doors could be supplied in Douglas fir at competitive prices, there is no reason why this business should not go to the United States. Other patterns used include one having four or six lights in the upper panel and two vertical panels in the lower part, with an apron between the upper and lower panel (pattern No. 111). Many other patterns are used, but those mentioned constitute the great majority, of which patterns Nos. 664, 666, and 864 are the ones generally requested, very large numbers having been used in municipal housing schemes during the past few years.

There is also a demand for vestibule doors, many homes in the United Kingdom having a small section of the ground floor entrance hall or passage separated from the main building in order to keep out drafts when the front door is opened. As a rule, doors used for vestibule purposes have the upper panel of glass, pattern No. 51 being one much used.

Outside back doors are plain, as a rule, little attention being given to their appearance. Pattern No. 444 in bead and butt, or in bead and butt half glass is largely used, and when less expensive doors are desired patterns Nos. YX 1, YX 2, XX 1, and XX 2 are used, these being of Swedish pine only.

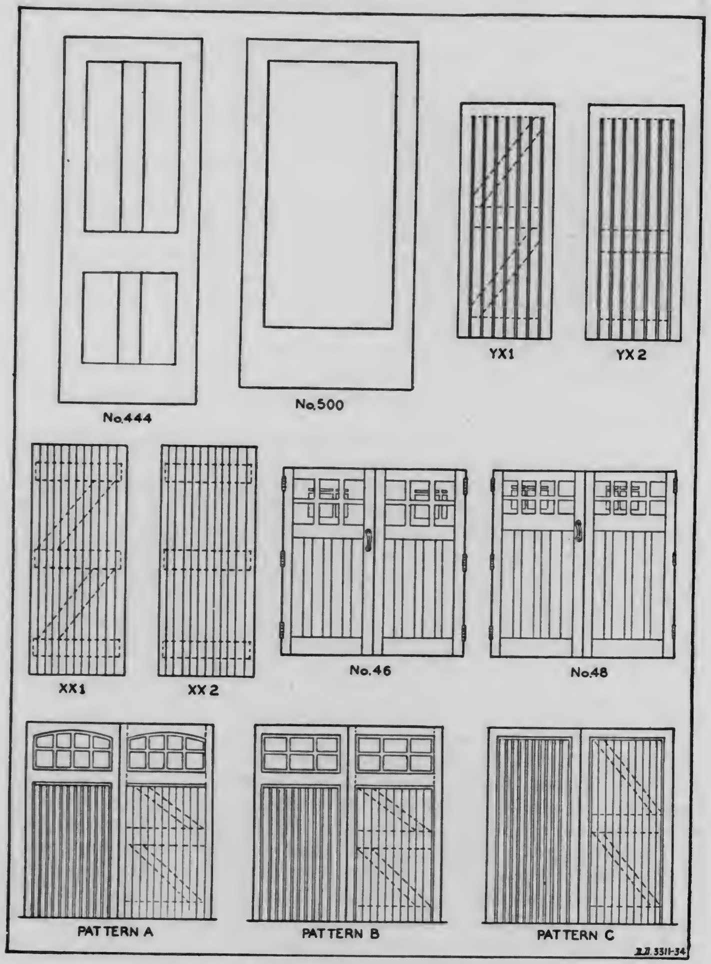


FIG. 44.—Patterns of stock doors used in Great Britain

In addition, there is a special type of door required by hospitals (pattern No. 500) but they are supplied to order according to the architect's specification.

The demand for garage doors is growing, the most popular patterns being A and B and to a lesser extent C in Swedish pine, and Nos. 46 and 48 in Douglas fir.

Many types of molding are used, but of these the ovolo and bead and cove are preferred for interior doors to any other, the ovolo being in greatest demand, the reason for this being that it is claimed it does not harbor dust as readily as other types. American Douglas fir door manufacturers use these types exclusively on the doors sold in the United Kingdom. For outside doors the bead and butt type is most popular.

While occasional sales are made of other patterns, the bulk of the doors sold in the United Kingdom are of the patterns mentioned.

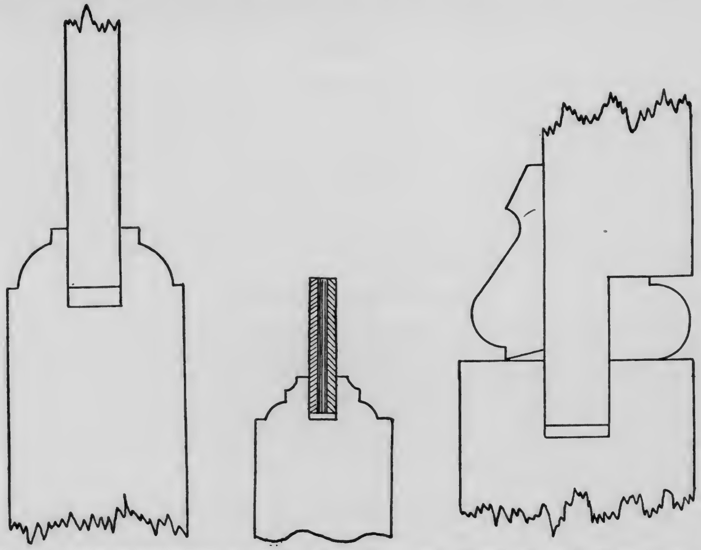


FIG. 45.—Types of molding used on imported doors: (1) Ovolo; (2) bead and cove; (3) bead and butt

STOCK SIZES

The sizes of stock doors generally sold in the United Kingdom are as follows:

Outside doors (front).—2 feet 8 inches by 6 feet 8 inches by 2 inches; 2 feet 10 inches by 6 feet 10 inches by 2 inches; 3 feet by 7 feet by 2 inches.

Outside doors (back).—2 feet 8 inches by 6 feet 8 inches by 1½ and 2 inches; 2 feet 6 inches by 6 feet 6 inches by 1½ and 2 inches.

Inside doors.—2 feet by 6 feet by 1¼ inches; 2 feet by 6 feet 6 inches by 1¼ and 1½ inches; 2 feet 3 inches by 6 feet 6 inches by 1½ inches; 2 feet 4 inches by 6 feet 4 inches by 1¼ and 1½ inches; 2 feet 4 inches by 6 feet 6 inches by 1½ inches; 2 feet 6 inches by 6 feet 6 inches by 1½ and 2 inches; 2 feet 8 inches by 6 feet 6 inches by 1½ inches; 2 feet 8 inches by 6 feet 8 inches by 1½ and 2 inches; 2 feet 10 inches by 6 feet 10 inches by 2 inches.

Casement and vestibule doors.—2 feet 6 inches by 6 feet 6 inches by 1½ and 2 inches; 2 feet 8 inches by 6 feet 8 inches by 1½ and 2 inches; 2 feet 10 inches by 6 feet 10 inches by 2 inches; 3 feet by 7 feet by 2 inches, all single doors; 3 feet 8 inches by 6 feet 8 inches by 2 inches; 3 feet 10 inches by 6 feet 10 inches by 2 inches; 3 feet 6 inches by 7 feet by 2 inches; 4 feet by 7 feet by 2 inches; all these are in pairs, rabbetted, each door being one-half the width shown.

Garage doors.—7 feet 6 inches by 7 feet 6 inches by 2 inches; 7 feet 9 inches by 7 feet 9 inches by 2 inches; 8 by 8 feet by 2 inches; all these are in pairs, rabbetted, each door being one-half the width shown.

Thicknesses given are nominal, the doors being finished as follows: 1¼ inches, nominal; 1⅛ inches, actual, 1½ inches, nominal; 1⅜ inches actual, 2 inches nominal; 1¾ inches actual.

Not all these sizes are stocked in every pattern, certain ones being called for in particular sizes only. Swedish doors are also supplied in actual 1⅝ inches when required, but there is only a small demand for them.

While Swedish manufacturers include many other sizes in their standard price list, the great bulk of the demand from the British market is for the above sizes, and it is doubtful if any additional business would be gained by the United States adding to the number of sizes already shipped.

FINISH

Many of the doors used in dwelling houses are painted, and for this reason the attractive figure of the Douglas fir plywood panels does not contribute to the extent one might suppose to its sales. For the same reason, the joints and knots on the Swedish and other European doors are not considered a defect. However, efforts are being made by distributors of Douglas fir doors to encourage the use of stain instead of paint on interior doors, in order that the beautiful grain of this species may be taken advantage of, and are meeting with considerable success.

SALES METHODS AND PRICES

The import trade in doors is done both direct with importers and also through accredited agents or brokers acting on a commission basis for the foreign manufacturer. The latter method is used by Sweden and most of the other European countries, while American exporters use both. The largest export door organization, however, has recently decided to appoint distributors on an out-and-out purchase basis for the sale of its product and dispense with the service of agents altogether.

These importers and/or distributors, in turn, sell either direct to the consumers or to the merchants. The question as to which is the best method is still a matter of debate, opinion being divided.

The United Kingdom is a highly competitive door market, and prices are very finely shaded, so that 3d. per door will frequently make all the difference between securing or losing the business. Generally speaking, there is little difference in price between the American, Swedish, and Dutch doors. Other doors are not imported in sufficient quantities to be considered real competitors. During the early summer of 1927 the market value of the Swedish pine four-panel type of door in first grade was approximately 8s. 4d. c. i. f. any regular United Kingdom port.

TRADE UNIONS

Unless the approval of the joint committee of the National Federation of Building Trades Employers of Great Britain and Ireland and the Amalgamated Society of Woodworkers is obtained, there is difficulty in selling imported doors in many sections of Great Britain. Conditions vary in different parts; in some opposition to nonapproved doors is such as to prevent their use, while in others little difficulty is met with. Most municipal housing contracts, however, bear a union clause, and many contractors for these schemes

will only buy approved doors. As far as Scotland is concerned, however, regardless of whether or not union approval has been obtained, imported doors are strongly opposed, and few are hung in that country.

The authority to grant a union permit for imported doors and millwork is vested in a joint committee representing the Amalgamated Society of Woodworkers and the National Federation of Building Trades Employers of Great Britain and Ireland, 48 Bedford Square, London, W. C. 1. This joint committee consists of equal numbers representing both the workers and employers and was formed shortly after the armistice to decide which foreign factories were operated under fair union conditions, as obtaining in the country in which they were located, for the protection of members of the federation and to enable them to avoid trouble on their jobs.

The following regulations, framed by the committee governing the conditions under which permits are granted, have been approved by the administrative committee of the national federation and the executive of the Amalgamated Society of Woodworkers:

> That the question of whether imported joinery [millwork] has been manufactured under fair conditions or not shall be settled under the following regulations:
>
> That the onus of proof is to be deemed to rest upon the importers. That the proof required may be supplied after the following method:
>
> The manufacturers of the joinery [millwork] desired to be imported shall get into communication with the woodworkers' union covering the district, or nearest district to where the goods are being manufactured, and request that union to nominate (say six) building-trade employers of such district who are recognized as fair employers, from among whom the manufacturers may select one or more to make a report as to whether the goods in question are made under fair conditions.
>
> The union likewise to appoint a representative, or representatives, to similarly make a report. The report may be a joint report signed by all representatives, or they may make separate reports.
>
> Such reports to be sent to the importers, who shall lay them before this joint committee which shall decide whether the goods are to be admitted or not.
>
> The importer must satisfy this joint committee as to the correct identity of the goods imported under such permission.
>
> All goods must bear the trade-mark of the manufacturers on the top edge of the top-rail.

If the application is approved the various local committees of the union are advised of the manufacturer's name and trade-mark. They are also published in the official journal of the woodworkers' union.

DESIRABLE FEATURES AND MARKING

Doors should have a smooth finish, be well cleaned and carefully handled during transit so as to arrive in an undamaged condition. Where doors are manufactured with solid panels, particular attention should be paid to the distance left between the panel itself and the stiles or muntins. If sufficient space is not allowed, the door is apt to be broken through the panel absorbing moisture, either from the atmosphere or when treated either for paint or stain. If sufficient room has not been allowed for the panel to swell, the stiles are apt to open up at the joints. All marks should be put on the edge of the top-rail, either with a branding iron, rubber stamp, or stencil. It is inadvisable to place any marks on the panels or face of the doors as they are frequently difficult to remove. Swedish doors are always marked with the size, pattern, "Made in Sweden," and trade-mark of the exporter, and American exporters would be well advised to follow their example.

In considering the British door market it must be remembered that, in order to be in a position to meet their customers' requirements and give prompt delivery, importers must carry large stocks. Most business being for immediate delivery, it is not possible, owing to the great distance separating them from the source of supply, to supplement any particular item at short notice. With constant changes in c. i. f. values, it is therefore, under conditions that have prevailed during the past few years, difficult for importers to intelligently quote their customers; neither can builders correctly estimate for construction work. While gradual price changes, either up or down, can readily be taken care of, violent fluctuations are most detrimental to trade and tend to drive it where stability in values can be anticipated. American exporters could not fail to benefit from stability in prices, and every effort should be made toward this end.

FUTURE OUTLOOK

The remarkable growth in the import of manufactured doors has naturally been caused by the great activity in the house-building industry. The majority of the houses erected under municipal housing schemes are too expensive for those most in need of accommodation, the rent being approximately £1 per week, which is more than the so-called working class, whose earnings rarely exceed £2 10s. or £3 per week, can afford. As a consequence, most of them are either occupied by two or three families, or else by one of a higher social class than those for which they were built. It is therefore probable that the next few years will witness a revival of activity by speculative builders in the erection of dwellings to rent at not more than 10s. per week, for which there is a great need, and which will undoubtedly be met as soon as the cost of building makes them a profitable investment. These houses will call for large quantities of doors, the bulk of which should be furnished by the United States.

While the Douglas fir door has gained a most favorable position in the British door market, it will be necessary not to relax any effort to retain this trade, but to continue by advertising and stabilization of prices to keep it constantly before the importers, dealers, and consumers. Swedish competition may have been successfully met for the time being; but it is still a serious factor to be reckoned with, and exporters in that country are not likely to overlook any opportunity of regaining the business they formerly held. It also must not be forgotten that Swedish door factories have little difficulty in securing a union permit, and have the great advantage of frequent steamship service to practically all British ports, both regular and outports, at less than one-third of what it costs to carry doors from the Pacific coast to these ports.

Also, regular door tonnage, only being available from the Pacific coast to main United Kingdom ports such as London, Liverpool, Manchester, Avonmouth, Glasgow, and occasionally Hull, Newcastle, and Garston, a heavy transshipment charge of 40 cents per 100 pounds must be paid to the secondary or outports by American doors, a charge which the Swedish entirely escape.

MOLDINGS

Next to doors, the most important item of builder's woodwork imported by Great Britain is interior finish, furnished largely by Sweden. Recently, however, small quantities have been imported from Holland made from imported north European pine, at slightly lower prices than the Swedish. Imported stock, however, represents only a small proportion of the annual consumption; and British manufacturers, by using American machines or British machines incorporating American ideas, are rapidly reaching the stage where they can produce at prices less than the imported article costs. As a consequence, an increasing proportion is being made locally, and that proportion is likely to grow in the future as more factories install up-to-date machinery.

Imported millwork, excluding doors, consists principally of architraves, baseboards, architrave base and door moldings, bolection moldings, handrails, and picture molding, the sizes and patterns of which have largely been standardized and are the same whether made in Great Britain or abroad.

The Swedish stock is sold on a standard list, the unit of sale being 100 running feet with a discount to meet the varying market conditions.

WINDOW FRAMES AND SASH

Very few ready-made window frames or sash are imported into the United Kingdom for the reason that there is such a multiplicity of sizes used for the different types of houses that it is practically impossible for dealers to carry stocks to meet potential demands. The designs constantly change to meet the demand for variation in the types of houses built so as to avoid the unsightly appearance of long streets of houses all alike. There is no such thing as a standardized window sash in Great Britain at the present time because this is just what architects are trying to avoid. Varying the size and type of windows is one of the easiest ways to differentiate dwelling houses, and full advantage has been taken of it by the architects responsible for the designs of the majority of houses that have been erected during the past few years under municipal housing schemes.

In view of this situation, most of the window frames and sash used are made in local factories to order of the builder, and there would appear little probability of imported stock being able to replace it.

PLYWOOD

Only since 1925 have imports of plywood been shown separately in British statistics, and during that year there were brought in a total of 218,471,355 square feet, valued at £1,446,653. With the exception of a small quantity of aeronautical plywood, practically the entire needs of Great Britain are imported.

SOURCES OF SUPPLY

The north European countries furnish the greater part of the plywood imported, of which Finland is the most important, followed by Estonia and Latvia. Next in importance are Germany, Russia, Lithuania, and Poland, while small quantities of various species are received from numerous countries.

STANDARD FORM OF CONTRACT

The import trade in plywood is conducted through agents acting on a commission basis for foreign shippers, sales being confined to recognized importers. A standard form of contract, known as the Rufod, has been adopted by the plywood section of the timber trades federation and accepted by shippers in all producing countries selling to the United Kingdom. A copy of this contract is as follows:

Plywood C. I. F. Contract Form

Code Name: "RUFOD"

Sold for account of ---------- to ---------- through Messrs. ---------- as agents a quantity of ---------- plywood. Manufactured by ---------- of the specification stated below for shipment ----------. All prices are per ---------- and include cost, freight, and insurance to ----------.

SPECIFICATION

Mark ---- Thickness ---- Quality ----- Quantity ---- Size ---- Price -----

1. *Quality protection.*—The goods are warranted to be fair average quality of the shippers' usual manufacture, properly protected until shipped and to be dispatched in undamaged condition from the warehouse or quay of shipping port. All goods to be shipped under deck.

2. *Payment.*—Payment for invoice amount to be made without discount by cash on arrival of, and in exchange for, shipping documents. Unless prepaid the freight to be deducted from the invoice and paid by buyers in terms of customary bill of lading.

3. *Property in goods.*—Property in goods to be deemed for all purposes (except retention of vendors' lien for unpaid purchase price) to have passed to buyers when goods have been put on board.

4. *Cancellation.*—Should shipment be delayed beyond the time stipulated buyers shall have the right to cancel such part of the contract which does not comply with the stipulated shipment dates and which is not already dispatched from the mill if they give due notice in writing to the agents in time to enable them to notify shippers by cable before the goods are dispatched from the mill. Specially cut sizes and cut sizes sold in sets which have been manufactured before receipt at the mill of telegraphic cancellation instructions must be accepted by buyers, provided the specification is immediately supplied and dispatch of the goods made from the mill within two weeks. If cut sizes are sold in sets buyers shall only be required to accept complete sets. Shippers not to be responsible for nondelivery or delay in shipment if arising from causes beyond their control.

Unless otherwise stated the term "shipment" means dispatch from the port.

5. *Claim.*—No claim for defective quality and/or manufacture (except for manufacture damp) shall be made in respect of any goods shipped under this contract unless written notice of claim is made to the agents within 10 days from the final delivery of goods into original public dock, warehouse or wharf, or private premises within the limits covered by the ordinary marine insurance policy. Invoice to be finally adjusted on proved contents of the parcel. Except at a public warehouse, claims for quantity and/or specification will be admitted only on packages which have not been opened. Packages opened not to exceed 10 per cent or 10 packages, whichever is the greater. No claim will be recognized on any package or packages which have been removed from the original dock or warehouse at the delivery port, but buyers shall be at liberty to deal with any package or packages on which there is no complaint without prejudice to their right to claim on any unopened packages under the arbitration clause. Buyers to declare the quantities, if any, which have been removed.

6. *Manufacture damp.*—Any goods shipped under this contract in which manufacture damp is present or may be detected within three months from delivery into original warehouse as in clause 5 shall not constitute good delivery. Buyers to produce proof of identity of goods if required.

7. *Insurance.*—Marine insurance to be covered by sellers or their brokers for c. i. f. value plus 10 per cent with Lloyds, or a first-class office (if a foreign office, to be one mutually agreed upon in writing between buyer and seller) under policies payable in sterling in Great Britain issued in Lloyds form containing institute cargo clauses on W. A. terms irrespective of percentage, including war risk and fresh-water damage, and warehouse to warehouse clause.

8. *Quality variations.*—In the case of stock sizes or boards "as falling" the shippers at their option may ship 2½ per cent in footage more or less than the contract quantity of each item of the specification. In the case of boards to be cut to special sizes the exact quantity must be shipped as called for in the contract. The term "as falling" is to cover a variation of 10 per cent in length and/or width from the sizes mentioned in the contract.

9. *Duties.*—Export duty (if any) to be paid by the sellers. Import duty (if any) to be paid by the buyers.

10. *Arbitration.*—Should any dispute arise under this contract, which it may be found impossible to settle by amicable arrangement, buyers shall not reject the goods herein specified provided they reasonably comply with the contract; but shall accept and pay for them in terms of the contract; such payment shall not prejudice the buyers' right of claim. Such dispute shall forthwith be referred to the decision of a third party to be mutually agreed upon, or in default of agreement to two arbitrators, one arbitrator to be appointed by the sellers and one by the buyers; such arbitrators shall previously to entering upon the arbitration appoint an umpire and the arbitration shall be subject to the English arbitration act of 1889 or any subsisting statutory modification thereof or substitution therefor. In the case of a claim not exceeding £25, the dispute shall, if not amicably settled, be referred to one arbitrator. In the event of either side failing to appoint or failing to agree to the appointment of an arbitrator within seven days after being requested by registered letter through the agents under this contract so to do, the arbitrator thus required shall be appointed by the chairman, or, failing him, the deputy chairman for the time being of the plywood section of the Timber Trade Federation of the United Kingdom on the application of either party. Every arbitrator shall be selected from the approved list of arbitrators issued by the plywood section of the Timber Trade Federation of the United Kingdom, or shall be conversant with the plywood trade. The umpire (if any) shall be a member of the plywood section of the Timber Trade Federation of the United Kingdom. Any award shall be final and binding upon both parties. The costs of such arbitration shall be left to the discretion of the arbitrators or umpire who, in deciding as to costs, shall take into consideration the correspondence between the parties relating to the dispute and the respective efforts to arrive at a fair settlement. This agreement shall be made a rule of court on the application of either party. This clause does not apply to any parcel shipped to countries other than the United Kingdom.

11. *Noncompliance.*—In case of the noncompliance by the buyers with any of the terms of this contract, sellers to have immediate power of resale for buyers' account after due notice in writing has been given.

AGENCY AGREEMENTS

Sales agency agreements are generally made on an exclusive basis, the usual terms being 4 per cent commission and del credere together with 2½ per cent discount, both calculated on the f. o. b. value, but of recent years the discount on plywood has been inoperative.

However, on account of connections made years ago before agency arrangements had been established, there are some importers who buy certain manufacturers' stock direct, but mention of this fact is always made when a selling agreement is concluded.

GRADING RULES

There are no established universal grading rules for plywood, but custom has established certain broad lines of definement which, generally speaking, are as follows:

AA quality.—Free of all defects on both sides.

A quality.—Only a little inferior to AA. Usually one perfect side with an occasional small sound knot or other slight defect on the reverse.

B quality.—A large proportion of the sheets are practically clear on one side. When defects exist they are not serious and the knots are small and sound.

BB quality.—Contains unsound knots and splits or boards degraded from B quality.

The quality, however, naturally varies with the individual shipper, and some through excellence of manufacture and careful grading have established such a reputation of excellence for their product that it brings a premium.

European birch and alder plywood is not generally sanded unless specifically required by the buyer, while oak, okoumé (gabon), and pine are always sanded.

Douglas fir.—The grading rules of Douglas fir are well established and sales made in this country are on the following basis:

AA quality.—Clear both sides.
A quality.—Clear one side.
B (shop) quality.—Permits small defects, such as checks, pitch pockets, and discoloration (chiefly red and brown stain), on both sides. The best side to be reasonably clear, most defects being on the reverse.

Douglas fir plywood is always imported sanded on both sides.

SIZES AND CONSTRUCTION

European plywood is imported in a great variety of stock sizes, ranging from 24 by 24 to 84 by 48 inches, in thicknesses of 3, 4, 4½, 5, 6, 8, 9, 12½, 15, 18, and 25 millimeters. While, however, the thickness is always in millimeters, some countries cut to inch sizes while others use the metric system of measurement throughout. By using the metric system, manufacturers make a slight gain in measure so that while inch measurement is preferred by the British trade they have not so far been able to induce the manufacturers to meet them entirely in this matter.

Generally speaking, all thicknesses of plywood up to 6 millimeters (¼ inch) are constructed in three-ply while over are multi-ply, 5 7, 9, etc., built up according to accepted plywood practice.

In addition to stock sizes, orders are accepted by foreign producers for special sizes, if required by the buyer, and these are known in the trade as "cut" sizes and are delivered in from six to eight weeks from acceptance of order.

Douglas fir plywood is imported in 3/16, ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞, and 1 inch, the sizes being those finished after sanding. All plywood in stock sizes runs on the even 2-inch width in lengths of 48, 60, 66, 72, 84, and 96 inches.

In the British plywood trade the grain of the wood always runs the way of the first-named dimension, or the reverse of the custom in the United States. Plywood is generally made by cementing or gluing together several thin sheets of wood or plies, either of equal or unequal thicknesses, depending upon the thickness of plywood desired; the grains of the adjacent sheets are set at right angles to each other. This process is called crossbanding. In some of the heavier thicknesses the plywood is made either by veneering on a core composed of narrow pieces of pine lumber, or "battens" as they are called, or else on a core of thin strips set at right angles to the outer pieces, both of these being known as laminated boards.

The construction of plywood not only prevents warping but gives great strength to the sheet, so that very much thinner boards can be used than if solid lumber were employed.

The following table shows in convenient form the equivalent in inches of metric sizes:

Centimeters	Inches [1]	Centimeters	Inches [1]	Centimeters	Inches [1]	Centimeters	Inches [1]	Millimeters	Inches [1]
47.5	18¾	75.0	29½	102.5	40⅜	130.0	51⅛	3	⅛
50.0	19⅝	77.5	30½	105.0	41⅜	132.5	52⅛	4	5/32
52.5	20⅝	80.0	31½	107.5	42¼	135.0	53⅛	4½	3/16
55.0	21⅝	82.5	32½	110.0	43¼	137.5	54⅛	5	3/16
57.5	22⅝	85.0	33½	112.5	44¼	140.0	55⅛	6	¼
60.0	23⅝	87.5	34½	115.0	45¼	142.5	56⅛	8	5/16
62.5	24⅝	90.0	35⅜	117.5	46¼	145.0	57⅛	9	⅜
65.0	25⅝	92.5	36⅜	120.0	47¼	147.5	58⅛	12½	½
67.5	26⅝	95.0	37⅜	122.5	48¼	150.0	59	15	⅝
70.0	27½	97.5	38⅜	125.0	49¼	152.5	60	18	¾
72.5	28½	100.0	39⅜	127.5	50¼	155.0	61	25	1

[1] Approximate.

One square meter equals 10.764 square feet.

The following table shows the approximate weight, of important species, in pounds per 100 square feet, bundled:

Thickness	Birch	Alder	Thickness	Douglas fir
3 millimeters	40	35	3/16 inch	65
4 millimeters	56	49	¼ inch	85
4½ millimeters	61	54	5/16 inch	100
5 millimeters	67	60	⅜ inch	120
6 millimeters	82	73	7/16 inch	135
9 millimeters	122	108	½ inch	160
12½ millimeters	170	150	⅝ inch	195
15 millimeters	202	177	¾ inch	235
18 millimeters	244	216	⅞ inch	275
25 millimeters	340	300	1 inch	315

PACKING AND MARKING

Plywood is imported in both packages and crates, the number of sheets in each varying with the thickness. In the lower grades packages are generally used and are either wire bound or roped, but in the upper grades and more valuable species, such as okoumé, oak, birch, pine, and Douglas fir, the sheets are crated.

Each bundle or crate is required to be clearly marked with the number of pieces, grade, thickness, and size, together with shippers' mark and, if desired, the buyers' mark also.

CHIEF USES OF PLYWOOD

It is impossible to name all the uses to which plywood is put in Great Britain; the range is wide and continually increasing, but the main outlets are as follows:

The furniture trade.—Plywood has a very wide application in the furniture industry, the largest consumer in the British market. It is used both for light work, such as drawer bottoms, backs of wardrobes and cabinets, partitions, and panels; and heavier work, such as table tops, bedstead ends, and wardrobe sides and doors. All kinds of plywood are used in various qualities and sizes, the heavy laminated board finding an important outlet, in many cases being used as a core for expensive figured veneers.

Building and construction.—Next in importance is the building and construction industry, where it is extensively used for wall paneling, ceilings, framed partitions in offices and restaurants, built-in cupboards, door and cupboard panels, and sliding doors. The growing fashion of paneled interiors, particularly in banks, for backgrounds and walls of display windows in department stores, is causing an increased demand for heavy boards, both multi-ply and laminated, which, in many cases, are veneered with mahogany, walnut, or some other figured wood. Flush doors for hospitals, where a perfectly smooth surface free from projecting molding is required, are frequently made of plywood, and generally smooth-surfaced plywood doors, veneered with expensive hardwoods, are called for by the architect to fit in with the scheme of interior decoration.

Shipbuilding.—The shipbuilding industry is another important outlet for plywood and, when active, consumes considerable quantities. The use of heavy plywood for bulkheading and lining has greatly increased during the past few years and is now an important item. For these purposes $\frac{5}{8}$ inch and 1 inch in five and seven ply are employed. Cross-banded or multi-ply boards are always required, it being claimed that laminated boards will not stand up under the strain of constant vibration. Substantial quantities of thin plywood are also used for saloon and door paneling, and also for the manufacture of stateroom furniture.

An interesting development in the use of plywood by the shipbuilding industry has been for the construction of collapsible dinghies which can be easily stowed away in a limited space and which only weigh 30 pounds. A portable canoe also made of plywood is having considerable sale.

Motor vehicles.—The motor-vehicle industry is another important consumer of plywood especially in omnibus bodies for interior panels, seat backs, and route boards. Dashboards and roofs, covered with a waterproof material, of automobiles are frequently made of plywood, while it is also entering into the construction of railroad passenger cars for panels and ceilings to an increasing extent. Bodies of light commercial vehicles and caravans, side cars of motor cycles, and perambulators, are frequently made of plywood.

Containers.—For egg crates, traveling trunks and boxes of all descriptions, particularly those used by the laundry, millinery, and costume trades, plywood is extensively used. More particularly, however, for tea chests has it so far found its main outlet as a container material. Plywood for tea chests is imported ready cut to size (the standard size of a chest being 19 by 19 by 24 inches) and shipped from the United Kingdom to the tea producing countries.

Cinema and theatrical scenery.—Plywood is being used to some extent for cinema scenery, having been found suitable for that purpose, but so far its use has been limited by the small production of films. The increase in the number of studios and extension of others in anticipation of the greater demand for British films under the quota system will no doubt lead to a greater consumption of plywood by the moving-picture industry and benefit the plywood trade to a considerable extent.

Little use is made of it for theatrical scenery or temporary booths or stands at exhibitions, the reason being that the fire prevention authorities claim it is highly inflammable owing to the plies separating under the action of heat and thus making it burn more rapidly than solid lumber. The same regulations referring to plywood also apply to solid wood, the objection not having reference to plywood as such but only on account of its thickness and the propensity of the plies to separate. If, however, the plywood has been thoroughly impregnated with ammonium phosphate there is no objection to its use but the cost has so far been found prohibitive as compared with ordinary canvas scenery which may be sprayed with the solution, or ordinary lumber if for exhibition stands.

Store fittings.—Counter tops, bottoms of stock trays and drawers, and window display easels, are being made from plywood to an increasing extent.

Airplanes.—Plywood also enters into the construction of airplanes but as only the domestic product is used for this purpose reference is made to it in the section on "Wood consuming industries."

Miscellaneous.—While the industries already mentioned account for the bulk of the plywood consumed there are a great variety of other uses which, while small individually, in the aggregate account for quite a considerable consumption. Among these are toys, window display boards, trouser and tie presses, drawing boards, and blocks for mounting of printing-press electros.

It is in the manufacture of the multiplicity of small articles for which plywood is well fitted that provides an important avenue for the utilization of pieces too small for other work.

PRINCIPAL KINDS IMPORTED

The principal kinds of plywood imported are birch, alder, okoumé, Douglas fir, oak, and Swedish and Norwegian pine. In addition to these, there are also small quantities of various other kinds such as ash, aspen, Philippine mahogany, and African walnut, but these are of little importance.

Birch.—This is the most important kind of plywood used in Great Britain, three-ply 4 millimeters ($\frac{5}{32}$ inch) being in greatest demand, followed by 3 millimeters ($\frac{1}{8}$ inch), but thicker boards, particularly 5 millimeters ($\frac{3}{16}$ inch) and 6 millimeters ($\frac{1}{4}$ inch) up to 9 millimeters ($\frac{3}{8}$ inch) are also used. Most of this is furnished by Finland, the industry in that country being almost exclusively occupied with this species, about 40 per cent in value of the British imports being furnished by that country. Smaller quantities are also received from Latvia (shipped through Riga), Estonia (shipped through Reval), and Russia (shipped through Riga). The Estonian product, however, is controlled by a British firm and sold by them in the United Kingdom. In these countries, including Poland (which, however, lies too far south for birch), was located, before the war, the former Russian plywood industry, the original home of plywood manufacture on a commercial scale in Europe.

Birch plywood is used for a great variety of purposes, among the chief being for the manufacture of furniture, much of it being stained a mahogany finish. It is also used for interior panels, seat backs and route boards of motor omnibuses, panels and ceilings of railroad passenger cars, bodies of light commercial vehicles, side-cars of motor cycles, and perambulators. For box making, egg crates, traveling trunks, and trouser and tie presses birch is a favorite plywood and is used either in a natural or stained finish.

In addition to these, tea-chest stock, which must necessarily be made from an odorless wood, is always made of birch.

Alder.—Russia, Poland, Latvia, and Lithuania are the principal countries of supply for alder, the most generally used sizes in the upper grades being 5 millimeters ($\frac{3}{16}$ inch) and 6 millimeters (¼ inch), while in the lower, 3 millimeters (⅛ inch) is most called for.

Alder is used for similar purposes as birch but where a less expensive material is required. Its chief outlet is in the furniture industry for drawer bottoms and backing of wardrobes and cabinets. A considerable quantity is also used for box making, while the textile industry uses it for wrapping boards.

Alder runs to larger sizes generally than birch, which in some cases gives it an advantage over that plywood, it being possible to get 72 and 84 inch lengths, while in birch 60 inches is the maximum size usually manufactured.

Okoumé, or gabon.—Germany, the Netherlands, France, Norway, and Sweden are the principal sources of supply for this popular plywood, Germany being the most important. It is manufactured in the countries named from okoumé logs imported from French West Africa and sold in Great Britain as Gabon mahogany or gabon.

For ordinary work 4 millimeters ($\frac{5}{32}$ inch), 5 millimeters ($\frac{3}{16}$ inch), and 6 millimeters (¼ inch) are largely used, but there is an important market for thicknesses between 12½ millimeters (½ inch) and 25 millimeters (1 inch) for special purposes and most of the British trade in plywood thicknesses over 15 millimeters (⅝ inch) is in okoumé, although Douglas fir is now breaking into this business. One reason why heretofore okoumé has enjoyed almost a virtual monopoly of the heavy plywood business is because the British consuming industries demand a substantial outer veneer which may run to 3 millimeters (⅛ inch) in very heavy boards and the middle or core to be of a thick ply, and not built up of a large number of thin plies. Heavy okoumé plywood is made with a substantial central ply of 5 millimeters ($\frac{3}{16}$ inch) or 6 millimeters (¼ inch) with thinner plies on either side. It does not suit the Finnish birch manufacturers to construct their heavy plywood on this basis and they prefer to use a number of plies 1½ millimeters ($\frac{1}{16}$ inch) to 2 millimeters thick, but this is not liked in the British market and, as a result, most of the orders so far have been placed in okoumé.

Okoumé plywood in the thinner dimensions is used largely in the manufacture of furniture and for office partitions and panels. The shipbuilding industry is another important consumer, using it for saloon and door panels (either veneered or painted), bulkheading, lining, and stateroom furniture. Boards ⅞ inch and 1 inch thick are also in demand for table tops, the laminated boards being most favored. On account of the porous nature of this species which enables it to readily absorb glue, it is used to a great extent as a veneering base, the large sizes running from 72 by 48 inches to 120 by 60 inches being preferred for panelwork.

Douglas fir.—Douglas fir, or Oregon pine plywood to give it its British trade name, is imported from both the United States and British Columbia, the former furnishing the greater part. The chief call is for A grade in ¼ and ⅜ inch thicknesses for door panels and other panelwork, while ⅝ inch and thicker is being used to an increasing extent for bulkheading and lining of ships.

The beautiful figure of rotary cut Douglas fir is greatly enhanced by staining and presents a most attractive appearance; the large sizes and low cost at which it can be obtained are increasing its use for panelwork.

Oak.—Oak plywood is generally sold either as continental or Japanese. The continental is imported principally from Germany where it is made out of the so-called Austrian oak which may, however, originate in Czechoslovakia, Poland, Yugoslavia, or Russian Volhynia. Japanese oak is cut to inch measure, the face side only as a rule being sanded.

Oak plywood is chiefly used by the furniture industry and for wall and door panels, many houses now having rooms paneled in oak plywood and its use is increasing for this purpose. The thicknesses most in demand are 5 millimeters ($\frac{3}{16}$ inch) and 6 millimeters (¼ inch) and the most popular sizes 72 by 36 inches and 72 by 48 inches, and, to a lesser extent, 54 by 36 inches and 54 by 48 inches. While there is a good demand for rotary-cut plain oak plywood, stock figured one side and plain on the reverse is much favored.

Unlike other kinds, oak plywood is not made of oak throughout but consists of a core either single or three-ply of some other wood (in the continental usually okoumé or alder) with a thin oak veneer on either face. There has also been placed on the British market a plywood having continental figured oak on one side and okoumé on the reverse.

Swedish and Norwegian pine.—This plywood is used essentially for joinery purposes, particularly for ceilings, partitions, and door panels. After some difficulty, pine plywood appears to have established itself in the United Kingdom, a slight preference being shown the Swedish product but the total consumption is as yet of small proportions.

Siberian ash.—Small quantities of Siberian ash plywood are used and only as a substitute for oak where less expensive stock is required. It is manufactured in Manchuria and shipped through Tientsin, China, and Vladivostok, Russia. The principal sizes used are 5 millimeters ($\frac{3}{16}$ inch), 60 by 36 and 58 by 38 inches. The stock is well sanded and of first-class quality and manufacture.

Aspen.—When Finnish mills are short of birch logs they sometimes cut aspen plywood. It is, however, not popular in the British market and only small quantities are used and only as a substitute for alder for the cheapest kinds of work, principally boxes.

Cottonwood.—A few years ago cottonwood plywood from British Columbia was introduced in panel sizes but so far little progress has been made.

PRICES

The unit of sale in the import trade is 100 square feet in lots of 1 carload or multiples thereof. In most of the European plywood-producing countries a car has a capacity of 15 long tons.

In the wholesale trade there is no minimum but some dealers add a little extra for 1-package orders, the unit of sale being 100 square feet as in the import trade.

There are given, in the following statement, the wholesale prices of plywood per 100 square feet ex warehouse or dock, current during the late summer of 1927, as an indication of what American manufacturers would have to meet in competition with them:

- Finnish birch:
  - 3 millimeters—
    - A quality, 15s. 6d.
    - B quality, 11s. 6d.
  - 4 millimeters—
    - AA quality, 22s.
    - A quality, 18s. 6d.
    - B quality, 13s. 6d.
    - BB quality, 10s.
  - 5 millimeters—
    - A quality, 23s. 6d.
    - B quality, 16s.
    - BB quality, 11s. 6d.
  - 6 millimeters—
    - A quality, 27s. 6d.
    - B quality, 18s.
  - 9 millimeters—
    - AA quality, 43s.
    - A quality, 36s. 6d.
- Alder:
  - 3 millimeters—
    - AA quality, 10s.
    - A quality, 8s.
    - B quality, 7s. 6d.
  - 4 millimeters—
    - A quality, 10s. 9d.
    - B quality, 9s. 3d.
  - 5 millimeters, A quality, 15s. 9d.
- Okoumé:
  - 4 millimeters—
    - First quality, 24s.
    - Second quality, 18s.
  - 5 millimeters—
    - First quality, 27s. 6d.
    - Second quality, 22s. 6d.
  - 6 millimeters, first quality, 35s.
  - 9 millimeters, first quality, 51s.
- Okoumé, laminated (large panels):
  - ⅜ inch, first quality, 77s.
  - ½ inch, first quality, 85s.
  - ⅝ inch, first quality, 98s.
  - ¾ inch, first quality, 108s.
  - ⅞ inch, first quality, 115s.
  - 1 inch, first quality, 132s.
  - 1 3/16 inches, first quality, 148s.
  - 1¼ inches, first quality, 156s.
  - 1⅜ inches, first quality, 168s.
  - 1½ inches, first quality, 182s.
  - 1⅝ inches, first quality, 188s.
  - 1¾ inches, first quality, 208s.
  - 2 inches, first quality, 236s.
- Siberian ash:
  - 4 millimeters, A and B combined quality, 19s.
  - 5 millimeters, AA quality, 29s.
  - 5 millimeters, A and B combined quality, 21s.
- Japanese figured oak:
  - 3/16 inch, AA quality, 55s.
  - ¼ inch, AA quality, 61s.
  - ¼ inch, A quality, 56s.
- Continental figured oak:
  - 5 millimeters—
    - AA quality, 60s.
    - A quality, 57s. 6d.
  - 6 millimeters—
    - AA quality, 62s. 6d.
    - A quality, 60s.
- Continental plain oak:
  - 5 millimeters, AA quality, 46s. 6d.
  - 6 millimeters, AA quality, 52s. 6d.

It must be understood that the figures above are only approximate and cover an average specification of the thicknesses and quality given. Special sizes and particular brands naturally command a premium.

ADHESIVES USED IN IMPORTED PLYWOOD

Most of the plywood imported by Great Britain is cemented with either casein or blood albumen waterproof glue and great importance is attached to this point by the consumers. Builders of omnibus bodies, for instance, subject the wood to severe tests to ascertain its waterproof qualities. The reason for this will be readily understood if it is remembered that much of it is used for outside seat backs and, as most of the omnibuses are uncovered, it is exposed to alternating wet and dry conditions for most of the year.

As the value of a plywood board depends almost entirely upon the perfect adhesion of the plies, the formulas of the cement or glue used by the various manufacturers are closely guarded. The following table shows comparative particulars of various glues and cements used in the manufacture of plywood and for veneering:

Particulars compared	Animal glue	Casein	Vegetable glue	Blood cement	Liquid glue
Ingredients	Hides, bones, horns, etc.	Casein from milk.	Cassava starch	Dried blood	Animal glue or fish parts.
Spread per pound	25 to 35 square feet.	35 to 55 square feet.	35 to 50 square feet.	30 to 100 square feet.	Unknown.
Manner of spreading.	Soaked in water and melted.	Mixed cold while stirring rapidly.	Mixed with alkali and cold or hot water.	Mixed cold	No preparation.
Application	Warm with brush or mechanical spreader.	Cold with brush or mechanical spreader.	As per casein; not by hand.	As per casein	Cold or warm usually applied by hand.
Temperature of press.	Cold or hot	Cold	Cold	Hot	Cold.
Shearing strength	High grade, stronger than strongest wood.	Equal to medium grade animal glue.	As per casein	High strength not used for joint work.	Best grade equal to medium grade animal glue.
Water resistance	Low	High	Low	High	Low.
Chief uses in woodworking.	Strong joint work.	Water resisting or joinery work.	Veneer work because of cheapness.	Water resistant plywood.	For repair work, etc.
Color	Darkish brown, shiny surface.	White, without shine.	Generally light color, glossy surface.	Darkish brown.	

TRADE PROMOTION

In the furtherance of the use of plywood, The Plywood Development Association was formed early in 1926. It is supported by contributions from agents and importers and also foreign manufacturers who stand to benefit by any increased consumption.

The objects for which this association was established, as published in the press, are as follows:

1. The promotion of the common interests of persons, firms, or companies engaged in the production, manufacture, shipping, importation, and sale of plywood.
2. To make known the technical and economical advantages and methods of using plywood for various purposes and to disseminate information on this subject among the general public, the engineering and allied industries, architects, builders, cabinetmakers, motor manufacturers, etc.
3. The collection and dissemination of statistical and other information relating to the plywood industry.
4. To call attention to the users of plywood by means of articles, advertisements, and paragraphs in suitable journals reaching the general public and in technical journals reaching architects, cabinetmakers, shop fitters, etc., and the insertion of suitable articles in standard works of reference for architects and others; and to prepare, print, publish, issue, acquire, and circulate books, papers, periodicals, gazettes, circulars, and other literary undertakings treating on, or bearing upon, the plywood trade or industry.
5. To insert advertisements in suitable journals and to adopt such other methods of propaganda as may be decided upon, such as exhibiting at trade or other exhibitions, circulating propaganda matter to distributors and consumers and/or by means of educational cinema films, etc.
6. To take such other action from time to time as may be deemed advisable in connection with matters affecting the interests of the plywood industry and to do all such lawful things as may be incidental to or conducive to the attainment of the above objects.

The association has an office from which its activities are directed and information regarding plywood and its uses may be obtained. Space has been taken at several building trades and home exhibitions, advertisements inserted and articles published in the press.

Overproduction creates buyers' market.—The great demand for plywood as well as other wood goods, immediately following the armistice, in 1920 caused a large number of new plywood factories to be erected in northern Europe, especially in Finland and Poland. As a result, in a short time, production not only caught up with, but far outstripped the demand and, as a consequence, prices dropped to a low level, and there has existed in Great Britain, the principal outlet, a buyers' market for several years. In order to meet the situation, export associations were formed in Finland and Latvia, the chief producers of birch plywood, in order to establish minimum prices and limit the number of agents offering stocks.

FUTURE OUTLOOK

The use of plywood is steadily growing in Great Britain and as its qualities become better known the consumption will doubtless further increase. There are still many suitable fields in which the use of plywood is but little developed and others which, although using it to some extent, are not taking full advantage of its possibilities.

The industry, through the Plywood Development Association, is now making a concerted effort to make known its technical and economic advantages not only to architects, builders, and furniture and box manufacturers but to the general public also.

The furniture industry, already the largest consumer of plywood, offers almost unlimited scope, but its use has been somewhat limited in the past to drawer bottoms and hidden parts by the popular misconception that solid furniture is better than veneered plywood. This opposition, however, is gradually disappearing and a noticeable increase is now apparent and is likely to still further increase in the future. Another factor that has handicapped the use of the more expensive veneered plywood by the furniture industry in the past has been the constant fluctuations in shippers' prices which caused importers to be reluctant to carry stocks on account of fear of depreciation in value leading ultimately to a heavy loss. Prices, however, have now been largely stabilized and this danger eliminated.

For the manufacture of containers, plywood would seem to have a great field in the British market, not only in the domestic trade but for export also, where strength combined with lightness is such an important factor. The question of finding outlets for the lower grades is already a serious problem so that its greater use for containers would go a long way toward a logical solution of this difficulty.

Plywood has already established itself for tea chests, egg crates, hat and costume boxes, laundry boxes, and traveling trunks, but as its peculiar advantages become better known it is reasonable to suppose it will be used to a much greater extent for containers than at present; those of a returnable variety offering a particularly wide scope.

The fact of its being available in the sizes and thicknesses desired is causing it to be utilized to an increasing extent for millwork purposes, such as built-in cupboards, partitions, door panels, and wainscoting. The question of finding a substitute for plaster on account of the scarcity of plasterers during the great activity in housebuilding has drawn attention to plywood during the past few years, its strength and lightness making it a very suitable material for paneling walls and ceilings, and its use for this purpose is increasing.

Another avenue which would appear to hold out decided possibilities for plywood is the manufacture of parquet flooring. Experiments have already been made with 9-millimeter ($\frac{3}{8}$-inch) material with satisfactory results.

The cost of manufacturing plywood in Great Britain, however, is so high that it can not economically be undertaken except for special sizes or for panels veneered with fancy or figured hardwoods, so that any increased consumption must necessarily be met by greater imports.

AMERICAN PARTICIPATION

The low price at which European plywood for ordinary use is sold in the United Kingdom makes it doubtful whether any considerable increase of business can be anticipated for the American product. Except for special purposes where large dimensions are desired, the cheap European birch or alder is quite satisfactory and, while the lower grades of these do not compare with similar grades in the United States, they are good enough for the purposes for which they are intended.

Whether American factories would be justified in manufacturing special low grades for export to the British market is a matter for them to decide but even should they do so it is not at all certain that, unless there was a very substantial margin under that for which north European birch can be bought, they would find a sale.

It would therefore seem as if the best opportunity for American plywood in Great Britain is for Douglas fir. It can be obtained in large dimensions, has an attractive figure, and is reasonable in price. If, however, full advantage is to be taken of the opportunity it is necessary that prices be stabilized as far as possible, so that importers may handle it with reasonable assurance of profit.

Unfortunately, in the past, there has been such keen competition for business among the American exporters themselves that c. i. f. quotations varied almost daily, with the result that the risk of handling Douglas fir plywood was considered so great that many of the larger importers either refused to handle it at all or else made no effort to push its sale, merely carrying a small stock to meet any call they might receive from their customers.

FURNITURE AND CABINET WARE

Considerable quantites of ready-made furniture and cabinet ware are imported into the United Kingdom, and in 1925 these imports had a value of £668,821; the principal countries furnishing these goods and the value from each being as shown in the following statement:

Czechoslovakia	£93, 861	Italy	£23, 521
Belgium	89, 889	Irish Free State	21, 078
Germany	83, 732	Sweden	17, 846
Poland (including Danzig)	71, 097	Netherlands	14, 534
France	65, 464	Switzerland	11, 980
United States	52, 017	Japan	9, 509
Austria	38, 305	All other	22, 286
Canada	27, 244		
Estonia	26, 458	Total	668, 821

These imports consist of special articles, the principal being office desks, chairs, and other equipment, and kitchen cabinets, from the United States; bentwood chairs and furniture from Czechoslovakia, Poland, Austria, and Estonia; gilt chairs and chairs covered with tapestry and needlework from Belgium; gilt and wicker furniture, also reproductions of period furniture of fine quality from France; office furniture, mainly of oak, from Germany; carved walnut chairs and furniture from Italy; and softwood kitchen dressers from Sweden and the Netherlands.

HOUSEHOLD WOODENWARE

Of the household woodenware, such as bread platters, trays, pastry boards, washboards, ironing boards, rolling-pins, spoons and forks, dishes, meat boards, salt and knife boxes, mouse traps, bowls, egg cups and racks, plate racks, potato mashers, clothes pegs, skewers, and the vast variety of articles included under this description imported, by far the greatest amount comes from Germany; during 1925, goods to the value of £103,401, or over 40 per cent of the total, coming from that country. Next in importance was the United States with £54,956, followed by Sweden with £26,158.

The following statement shows the principal countries and the value of imports of household woodenware from each during 1925:

Germany	£103, 401
United States	54, 956
Sweden	26, 158
Austria	15, 403
Norway	11, 419
Canada	£6, 812
All other	34, 671
Total	252, 820

TOOL HANDLES

The United States has the greater part of the British market for finished tool handles; during 1925, out of imports totaling 88,596 gross, valued at £230,337, no less than 65,386 gross (mostly hickory and ash), having a value of £211,707, came from that country.

Of the remainder, 3,460 gross, valued at £9,581, were from Canada, and 19,750 gross, valued at £9,049, from "all other" countries.

OTHER WOOD MANUFACTURES

No record is kept of the articles included in this classification of the British import statistics, so that it is impossible to give complete data. It is known, however, that the imports recorded include the following items: Pencil slats, dowels, bungs and plugs, mangle-roller blocks, match blocks, chip boxes, cars, wooden heels and heel blocks, veneers, shuttle blocks, rough-shaped golf-stick heads, bobbins and spools, reels, lasts and blocks, cask heads, chests, trunks, barrels and casks, shade rollers, toilet seats, washing machines, parquetry, handles (other than tool), wood labels, brush backs, and coat hangers.

The total value of all items included in this classification imported during 1925 was £2,540,603, but as the different items are not segregated, it is impossible to give any details.

The following table shows imports of wood manufactures into the United Kingdom during 1925:

Country	Plywood		Builder's wood work	Furniture and cabinet ware	Household woodenware	Tool handles	
	Quantity	Value				Quantity	Value
	Square feet					*Gross*	
Finland	95, 675, 794	£558, 052					
Estonia	22, 927, 539	159, 126		£26, 458			
Latvia	27, 791, 939	143, 211					
Germany	7, 262, 855	102, 389	£31, 843	83, 732	£103, 401		
Russia	18, 462, 098	89, 772					
Lithuania	7, 564, 568	77, 689					
Poland (including Danzig)	19, 096, 066	75, 385		71, 097			
Netherlands	4, 087, 134	59, 972	55, 739	14, 534	1, 799		
Norway	5, 702, 068	51, 158			11, 419		
United States	3, 630, 871	38, 784	558, 641	52, 017	54, 956	65, 386	£211, 707
Japan	1, 492, 799	33, 860		9, 509	1, 208		
France	2, 485, 715	33, 494		65, 464	5, 669		
Sweden	1, 055, 433	11, 998	335, 601	17, 846	26, 158		
Austria			20, 101	38, 305	15, 403		
Canada			17, 258	27, 244	6, 812	3, 460	9, 581
Belgium			16, 861	89, 889			
Italy			16, 134	23, 521			
Czechoslovakia				93, 861			
Irish Free State				21, 078			
Switzerland				11, 980			
All other	1, 236, 476	11, 763	34, 938	22, 286	25, 995	19, 750	9, 049
Total	218, 471, 355	1, 446, 653	1, 087, 116	668, 821	252, 820	88, 596	230, 337

NOTE.—The value of imports of all other wood manufactures, not shown in this table, from all sources in 1925 was £2,540,603; the total value of all wood manufactures was £6,226,350.

COMMENTS AND RECOMMENDATIONS

Although the United States has held its own in the United Kingdom lumber market, there is evidence that competition, not only from Empire-grown and central European woods but also from wood substitutes is increasing. If, therefore, this business is to be retained, let alone increased, American exporters can not afford to allow matters to rest as they are, but real efforts will have to be made to meet the changed conditions rapidly developing in the British lumber trade. If they are to be successfully met, steps must be taken not only to eliminate causes of criticism and complaint, but also such as will increase the demand for their product from the consuming industries in whose hands the decision ultimately rests. These matters are here discussed, and it is suggested that they receive careful consideration from exporters interested in selling American lumber in the British market.

MANUFACTURE

It is hardly possible to discuss American softwood lumber with a British importer to-day without receiving a criticism, invariably unfavorable, to its manufacture as contrasted with stock received from Scandinavia and Russia.

Complaint is made, and unfortunately with considerable justification, that it is impossible to get American softwoods sawn true to size. A variation of from ⅛ to ⅜-inch is not unusual, and, to make matters worse, this variation is not uniform, but boards or deals will frequently show a taper in both width and thickness.

When it is remembered that very little of this stock is used in its original form, most of it being remanufactured, it will readily be understood that extra expense is involved in dressing it to a uniform size. In many instances stock has to be run through the planer several times. Not only does this apply to dressing, but when resawing is done there is the difficulty of the irregular size of the last cut.

The opinion is held by most British importers that American manufacturers seem to think that, because their lumber is not scant, it is all right, but no greater mistake could be made; oversize is considered just as much a defect as scantness.

Practically all the north European softwood lumber imported into Great Britain is manufactured by the Swedish gang-saw method, which insures uniformity of size and enables remanufacturing to be done with a minimum of waste. Such a thing as a 3 by 9 inch Swedish, Finnish, or Russian deal measuring 2⅞ by 9⅛ inches at one end and 3 by 9¼ inches at the other is absolutely unknown, but unfortunately it is a common occurrence on parcels of softwoods arriving from the United States.

Quite recently a large manufacturer of paving blocks, who uses considerable north European pine each year, informed the writer that he knew of no reason why he should not use Douglas fir, but he had found it quite impossible to get stock that would hold exact to size, and as this was essential for paving blocks, he could not use the American product.

Comparisons, it is said, are odious, but they need not be if received in the right spirit, and they may be of considerable value if they show where faults lie and means can be taken to correct them.

The British lumber market is probably the most highly competitive in the world, with every wood-producing country striving for its trade, but such is the excellence of the manufacture of north European softwood lumber that it has become the standard by which every other country's product is compared.

Generally speaking, there is little complaint about the manufacture of American hardwood lumber, most of it arriving well and accurately sawn. Occasionally, however, sufficient care is not taken in trimming, and although allowance for "spur" ends may have been made in measuring, these detract from the appearance of the lumber and to that extent influence the buyer. A good-looking car of lumber is already half sold, and the little extra expense for trimming is amply repaid by the appearance and good will of the customer so obtained.

SEASONING

The matter of insufficient seasoning is one that particularly applies to American exporters of hardwood lumber, apart from the dangers of discoloration, twisting, and warping en route, the most frequent causes of claims in the British market.

Since the war one of the most noticeable changes that has taken place in the British hardwood import trade has been the great increase in the number of firms purchasing their needs on c. i. f. terms, particularly those located in the East London district. Before the war this trade was, to a great extent, concentrated in the hands of a comparatively few large importers who maintained considerable stocks and supplied the smaller yard keepers, but now these yard keepers buy on a c. i. f. basis. Space is scarce and expensive in London and, as a consequence, yards are no longer used for seasoning but merely for transit storage purposes. As a result, these importers, rightly or wrongly, expect to receive their lumber in such condition that it can move immediately into the furniture factories, the majority of which are without any kiln-drying facilities and operate on a hand-to-mouth basis. Every car of lumber is closely scrutinized for condition on arrival, and if a claim is made for insufficient seasoning the cost of storing at the docks (should the shipment be in London) amounts to about $10 per thousand feet, which is added to cover cost of storage until dry. The question of what constitutes "dry" lumber is one that should be qualified in all c. i. f. contracts, otherwise claims on this account will be settled on a personal rather than a contractual basis. Considerable trouble can be avoided by stating, during the sales negotiations, and inserting in the contract some description such as the number of months the stock has been "on sticks," "in good shipping condition," or "shipping dry" (but never as "dry" without any qualification), so that an affidavit can be furnished in the event of a claim.

Not only on account of claims is it important, however, that thoroughly seasoned hardwood lumber only should be shipped to the British market, but an exporter with a reputation for shipping it will always receive preference on an equal price basis, as naturally it moves faster from the importer's yard and enables him to increase his turnover.

A point not to be overlooked by American exporters is that transportation charges both in the United States and across the ocean are paid on actual weight of the lumber by themselves and that when unseasoned stock it shipped it simply means that money is being paid out of their own pockets to railroads and steamship companies for carrying water. On an average through rate from mill to United Kingdom port of say, 50 cents per 100 pounds, it is a very simple calculation to estimate what this loss amounts to on a carload of green or insufficiently seasoned hardwood lumber. There is, however, one notable exception to the rule of shipping thoroughly seasoned hardwood lumber, namely, ash, which it has been found from experience gives the best satisfaction if shipped 30 days dry.

Although the cost of ocean transportation is not affected by the dryness of softwood lumber, freight usually being paid on a measurement basis, many claims for discoloration arise through unseasoned stock being shipped, particularly on Sitka spruce and southern pine lumber, and as discoloration is considered a serious defect by the industries consuming these woods claims are usually very heavy.

It is suggested that American exporters might follow with advantage the practice of the north European softwood shippers of segregating any discolored stock that may develop in their yards and selling it separately.

Prior to the past year or two, this stock was frequently shipped mixed with the bright lumber, with the result that claims in such an event were usually settled by an "over-all" allowance; in other words, the value of the good stock was reduced as well as the discolored, it seldom being feasible to sort out the discolored stock on account of the heavy expense involved. In this connection it might be mentioned that, during the busy season in London, several months frequently elapse before cargoes are sorted and piled. Realizing this state of of affairs, steps were taken to remedy the situation, and since that time all discolored stock has been shipped on a separate bill of lading and sold at a reduction of from £2 to £2 10s. per standard under "bright" stock, which has worked out satisfactorily to both shippers and importers.

SPECIFICATIONS

Unsuitable specifications have been a severe handicap to the sale of American softwoods in the United Kingdom, particularly in regard to Douglas fir. While the long lengths and large sizes in which this is shipped make it desirable for some purposes, for many others they simply are an item of expense to the consumer, who must go to considerable expense remanufacturing before it can be used.

Year by year the Scandinavian shippers are, to a greater extent, cutting to the specification requirements of the British market, the higher prices obtained and avoidance of accumulations of undesirable sizes more than recompensing them for the loss in outturn.

In this connection particular reference is made to the lengths, which usually come in multiples of 2 feet. Uneven foot lengths are highly desirable from the consumers' point of view and exporters who guarantee a fair percentage of them in a shipment would in most cases receive preference.

PROMPT SETTLEMENT OF CLAIMS

Prompt settlement of claims is always desirable, and few instances are recorded of anything being gained by delay. As a prominent London wood agent remarked recently to the writer: "Lumber upon which a claim has been made never improves but as the negotiations are prolonged gets steadily worse. As a result, in many cases what might have been settled for a small sum at its inception eventually becomes a heavy claim with acrimony on both sides; heavy cable bills are incurred for shippers' account, and possibly the custom of a large buyer lost."

DOUGLAS FIR FOR HOUSE BUILDING

It is rather curious that although Douglas fir has been well known in Great Britain for many years, little effort has been made to introduce it for ordinary building purposes, but each year between two and one-half and three billion feet of softwood lumber are imported largely for this purpose. There is practically no difference in the price at which the merchantable grade of Douglas fir and the north European softwoods used can be delivered at British ports, and it would appear as if an important outlet for American lumber was being overlooked.

There are, however, two factors that must be considered by any exporters contemplating making a bid for this business—first, the specifications, and second, seasoning. As regards specifications, it must be admitted that, in order to make any headway at all, lumber cut full to the sizes required by the building industry, which are listed under the north European softwood section of this book, must be furnished. These, however, should be an advantage to the manufacturer rather than a handicap, as they cover such a wide range of sizes and lengths that the closest utilization of the log is effected. Very little lumber over 20 feet long is used for house building in Great Britain. It is not suggested here by what methods this stock should be cut by the American manufacturers, but with this large potential market available it would appear reasonable that methods that have been successfully used in other producing countries—i. e., the "gang" or "frame" saw— should be closely investigated to ascertain if they can not be applied in the United States also.

The British building trade also requires its lumber shipped dry and bright, as a large part of it passes directly from the docks into consumption, so that for Douglas fir to compete for this business it would have to be seasoned before shipment.

A desirable feature about the softwood import trade is that buyers are used to making their contracts a long time ahead of delivery, frequently from four to six months, so that, provided they were interested in Douglas fir, it could be sold on the same terms of delivery, thus enabling the manufacturers to select logs suitable for the purpose.

END-MATCHED LUMBER

The introduction of end-matched softwood flooring in the United States in 1927 opened up new possibilities for trade in southern pine and Douglas fir.

Although these woods have been known for many years in Great Britain, neither of them has been imported as flooring except in the form of blocks. When strip flooring was desired it has usually been manufactured locally from imported timber or flitches.

It must be stated at the start that it is doubtful, even if end matched, a market can be developed for softwood flooring in regular lengths, but the application of this method of manufacture to short lengths, 6 feet and under, opens distinct possibilities for the use of standard American sizes.

Many economic changes have taken place in the United Kingdom since the war, one of the most noticeable being the difficulty of obtaining domestic help. This new condition has contributed largely to the disuse of the fully carpeted floor, mats and runners taking their place to a large extent. These, naturally, do not look well on a floor of north European pine or spruce, with the result that the average householder is now more interested than ever before in a wood floor that does not have to be entirely covered. In addition, builders of homes, either for residence or resale, are beginning to realize the added value obtained by the inclusion of attractive floors.

In their efforts to develop the sale of short-length flooring in the British market it should be remembered by lumber exporters that American sizes and grades are totally unknown, so that full and complete details as to invoice and actual sizes, copies of grading rules, also fair average samples of what might be expected on shipments of each grade, should be forwarded to their agents in order that they may be submitted to prospective customers. It is also essential that continuity of supplies be assured if any sustained efforts are to be made to introduce it to the building trade, the complaint having been made in the past that when a market has been developed for an item out of the ordinary the supply has ceased and the efforts put forth on its behalf come to nothing.

Cost is naturally the prime consideration, but if short lengths of standard American flooring of either of the species named can be delivered at a price sufficiently under the cost of regular-length flooring made in domestic mills, the prospects are decidedly favorable to a fair amount of business being developed.

It must be emphasized, however, that there is no call for southern pine or Douglas fir flooring in short lengths at present, and any demand will have to be created as the result of considerable work on the part of the British agents of the American exporter, and immediate results must not be expected.

"BUY EMPIRE GOODS" CAMPAIGN

Lumber has not been overlooked in the campaign being conducted by the Empire Marketing Board to further the greater use of Empire products, attention having been drawn to Indian, Australian, and native woods for furniture, interior panels and finish of dwellings, railroad cars, steamer saloons and staterooms, and also to softwoods, particularly Douglas fir and spruce from Canada.

Speaking recently on the work of the Empire Marketing Board, the Secretary of State for Dominion Affairs and Secretary of State for the Colonies said: "We ought to focus our attention on Empire produce and Empire development. There is no doubt that a greater proportion of our lumber requirements can be supplied from Empire sources, and the variety of our hardwoods deserve a better market than there is at present. It is essential, however, not only that the technical qualities of a particular timber be first class but, before it has any chance of competing with old favorites, the extent of available supplies must be made known, reliability of grading assured, and guaranties given regarding regularity of delivery. These are matters of ordinary business routine, but noncompliance with them in the past has frequently spoiled the market for Empire products."

This speech by a cabinet minister shows the importance which this campaign has assumed in Great Britain.

In connection with this campaign it might be mentioned that there have recently been placarded, by the Empire Marketing Board, posters illustrating the various woods obtainable from Empire sources and urging the greater use of them.

Pressure is also being brought to bear on official and semiofficial bodies to give preference to Empire woods, and British railroad tenders for Douglas fir now limit bids to the product of British Columbia. The lead given by the railroads is being followed by many large dock contractors, shipbuilders, and importers who are now intimating that preference will be given to quotations for Dominion products.

As a result of these efforts, public and commercial opinion is being focused on Empire woods to a greater extent than ever before, and American woods are likely to meet increasing competition from them.

COMPETITION FROM CENTRAL EUROPE

During the past few years there has been increased competition from central Europe and Poland in the British hardwood market. Oak, ash, beech, and to some extent maple, are the principal species imported, but it is with the first two named that American lumber exporters are principally concerned, especially the Polish varieties.

Early in the fall of 1927 it became apparent that exporters in Poland intended to make a strong bid for the British automobile trades' ash requirements and quoted low prices for desirable specifications of logs, with the result that up to the end of November many of the log orders had gone to that country instead of the United States as heretofore.

Not only for ash, however, is European competition increasing but in oak also, in that a greater percentage of square-edged lumber is now being manufactured. While logs cut through and through have their advantages from the consumers' point of view for certain purposes, such as matching of panels and the wider widths and longer lengths obtainable, they are largely offset by the fact that the entire contents of the log must be taken and that greater waste and expense are incurred in conversion. The fact that American hardwood lumber can be obtained square edged and graded has contributed very largely to its popularity, and continental manufacturers are rapidly realizing that if they are to extend their hardwood business in Great Britain they will have to follow American manufacturing methods. As a result a noticeable increase in the quantity of square-edged lumber imported from central Europe and Poland is now apparent.

Maple, of which considerable quantities are imported from the United States for the British piano industry, is now being imported from Yugoslavia, Hungary, and Czechoslovakia at a lower price than the American product, and while the quantity received so far is small it is of excellent texture and it is extremely probable that it will increase as time goes on.

American exporters of these species would do well to recognize this increasing competition from European sources and not blind themselves to the fact that it exists and is likely to increase as time goes on.

LESSER KNOWN WOODS

With their appreciation in value, many American woods heretofore used in large quantities in the United Kingdom are being employed to a steadily decreasing extent, being replaced by less expensive woods. While it is doubtful if this business can ever be regained the changed values of the better known woods has opened up marketing possibilities in Great Britain for the lesser known commercial varieties, and provided the necessary steps are taken there is no reason why a demand for them should not be created. A perusal of the section of this publication on "Wood-consuming industries" will doubtless reveal the information that many species largely used in the United States in particular industries are not utilized in Great Britain although eminently suitable for the purpose.

The British however, as is well known, are an extremely conservative people. It is therefore suggested that, where an exporter believes there is an opportunity for developing a market for a certain species in which he is interested, a few thousand feet be included with one of his regular shipments and his agent be requested to give it to a large consumer free of charge, the only stipulation being that it will be given a fair trial. At the same time the agent should be furnished with as much information as possible, showing the suitability of the wood in question for the purposes for which it is offered.

After all, such woods as gum, magnolia, and tupelo are comparatively newcomers to the British market and the success with which they have met is an example to those wishing to sell species as little known to-day as these were a few years ago.

TECHNICAL AND INFORMATIVE LITERATURE

There is very little technical or informative literature on American woods available in the United Kingdom, and as a result a lack of knowledge pertaining to them is quite common even among those dealing in or using them.

Although it may hardly seem credible, in conversation with the writer a large consumer of American woods referred to "pitch pine" (the foreign name for southern pine) as coming from Sweden and Finland. This, after all, is natural; buyers obtaining their requirements from importers seldom trouble to ascertain the country of origin of the woods they use.

The most effective method of disseminating information about American woods would be by means of a booklet or brochure, confined to one species only including data on the sources of supply, methods of manufacture, description of the wood itself, and its principal uses; also, in simple language easily understandable by the ordinary builder or furniture manufacturer, an explanation of the various grades under which it is sold in the British market.

The matter of illustrations is of particular importance, as many as possible being included and selected to bring out the different phases discussed in the booklet. It would be advantageous if illustrations of the wood itself be shown, not only in the natural color, but also after treatment with various stains, if it is a wood suitable for color treatment

Especially, however, in regard to woods used for structural purposes should complete information on their physical and mechanical properties be given, such as would satisfy an architect or engineer. The decision as to the species used on a particular job rests entirely in their hands, and if they are to approve a wood with which they have had no previous experience they must be convinced of its suitability by means of data furnished from an impartial source based on standard tests such as are recognized by their professions.

As an illustration, in the latter part of 1927 a contract was let for jetty construction that required a large quantity of piling; but the engineer, not having had previous experience with Douglas fir for this purpose, refused to consider bids for that species until he first received proof, satisfactory to himself, that it was suitable.

Care should be taken to see that such information reaches the hands of the chief engineers and architects of municipalities, public utility corporations, etc., so that the wood in question may be included in the forms of tender, otherwise bids for it will not be considered.

ADVERTISING

It is somewhat surprising, considering the volume of lumber imported from the United States, that so little mention is made of it in the trade press.

Judicious advertising, not only in journals representing the import trade, but also those catering to the principal wood-using industries, such as furniture and building and architecture, could not fail to benefit the sale of American lumber in the British market. It is reasonable that the space allotted to news regarding different branches of the lumber trade is influenced to a large extent by the amount of advertising space taken by those interested in its sale, and the greater amount of advertising the more news space allotted.

In addition to the trade press, articles in the daily press and journals of the "home beautiful" type are also advisable. These should be in simple language, written in such a manner as to attract the attention of the man in the street and be free from any indication that it was inserted by any firm or association interested in its sale. Several excellent articles of this character, calling attention to the beauty and suitability of walnut for furniture purposes, also illustrating the many uses for plywood, have recently appeared in the London daily papers and also magazines of the character indicated, but, generally speaking, as far as American products are concerned, the field has been barely touched.

In making up advertising copy, however, it is essential that the British character be taken into consideration, it by no means following that material suitable for the United States would necessarily find favor in this country, and especially anything savoring of exaggeration in the slightest degree should be avoided. For these reasons it is advisable that a British advertising expert be consulted in the matter before any definite arrangements are made.

EXHIBITS

Each year exhibitions are held by the building and furniture trades in Great Britain, the principal ones being in London. Although this is the most important foreign market for American woods, so far those interested in their sale here have taken little, if any, part in these exhibitions.

At a building exhibition held in London early in 1927 there was an exhibit of Australasian hardwoods under the auspices of a leading importer which attracted wide attention; also a special exhibition of a number of Empire woods under the direction of the Imperial Institute, London, was held in cooperation with various groups of the Canadian Lumbermen's Association during the latter part of 1927.

While some booths at the above building trades' exhibition showed specimens of a few of the better-known American woods, they were given little prominence and, to those unfamiliar with the extent of the business done in them, were apparently of secondary importance.

American lumber exporters should not remain apathetic about this matter, as there is no doubt that the impressions gained at these trade exhibitions do influence buyers and contribute to the extension of particular woods. It is therefore recommended that careful consideration be given this matter by American lumber exporters and trade organizations interested in promoting lumber sales in the British market so that this omission may be rectified in future exhibitions. There would be little difficulty in arranging with a responsible importer to handle the matter, which would be less expensive and preferable to having it done by the American association itself.

FUTURE OUTLOOK

Owing to the activity in the house-building industry during the past five years, there has been an enormous demand for European softwoods largely used for that purpose. This activity, however, was not brought about by prosperous industrial conditions but was artificially stimulated by subsidies from governmental and municipal authorities, and while this industry was enjoying prosperity others such as shipbuilding, textiles, mining, and certain branches of the engineering industry suffered from depression. At no time were there less than 1,000,000 unemployed in the country, and during the coal stoppage of 1926 there were about 500,000 more.

However, American lumber enters little into house construction in Great Britain, except Douglas fir for millwork, in those of the better class, and for doors, so that United States exporters gained comparatively little benefit from this state of affairs.

It is generally accepted that the peak of the house-building program has been reached, but there is still a shortage of houses for the wage-earning classes to be met, and while the past years' records may not be duplicated, considerable house building is likely to be done for several years to come. It is, however, rather upon the revival in other industries, such as mentioned above, that the demand for American lumber chiefly depends, and there are signs that if recovery is not as rapid as was anticipated by some, the corner has been turned and a definite upward movement begun. Particularly in the shipbuilding industry is it most noticeable, more orders being now on the builders' books than at any time since the postwar boom of 1920.

With improved economic conditions the demand is also likely to increase for woods used in the manufacture of furniture, motor vehicles, and musical instruments, much of which is supplied by the United States.

To sum up, it may reasonably be assumed that while not equaling the demand of the past few years there will be needed large quantities of European softwoods and American doors for house-building purposes in the future, while increased quantities of both American softwoods and hardwoods will be required by those particular industries in which they are employed.

APPENDIX

UNITED STATES EXPORTS OF WOOD AND WOOD MANUFACTURES TO THE UNITED KINGDOM, 1927

Wood and manufactures	Quantity	Value
Unmanufactured wood, total...M feet	----------	$351,488
Logs and hewn timber:		
Hardwoods...do	4,267	246,965
Softwoods—		
Southern pine...do	435	21,680
Douglas fir...do	146	3,250
Cedar...do	496	29,048
Other softwood logs...do	144	8,507
Railroad ties:		
Hardwood...number	4,561	6,441
Softwood...do	46,525	30,082
Creosoted or otherwise preserved...do	593	722
Telegraph, trolley, and electric-light poles...do	1,575	4,793
Sawmill products, total	----------	23,997,323
Sawed timber:		
Softwoods—		
Southern pine...M feet	71,711	3,386,891
Douglas fir...do	19,111	476,632
Cedar...do	174	18,970
Other softwoods...do	291	15,250
Hardwoods...do	152	8,270
Creosoted or otherwise preserved—		
Other [1]...do	420	21,171
Boards, planks, and scantling:		
Softwoods...do	95,350	4,379,052
Cypress...do	2,271	141,630
Douglas fir—		
Rough...do	35,782	1,093,012
Dressed...do	2,098	73,767
Southern pine—		
Rough...do	44,103	2,231,661
Dressed...do	281	19,469
White, western, and sugar pine...do	2,565	213,406
Cedar...do	1,468	140,368
Redwood...do	357	26,349
Spruce...do	4,602	352,628
Hemlock...do	483	18,845
Small softwood dimension stock...do	972	42,450
Other softwoods...do	368	25,467
Hardwoods...do	223,029	15,681,745
Ash...do	23,250	1,495,762
Chestnut...do	2,527	141,481
Gum (red and sap)...do	19,208	1,002,906
Hickory...do	1,767	151,455
Oak...do	116,737	7,462,604
Poplar...do	24,610	1,647,945
Walnut...do	2,650	404,396
Mahogany...do	14,429	2,103,646
Tupelo and black gum...do	130	5,544
Birch, beech, and maple...do	950	112,774
Wagon-oak planks...do	7,226	470,035
Small hardwood dimension stock...do	1,005	138,649
Other hardwoods...do	8,540	544,548
Other sawed lumber...do	205	8,992
Shingles...thousands	161	350
Wood manufactures, total	----------	8,909,845
Cooperage:		
Staves—		
Tight...number	5,264,455	359,016
Slack...do	535,200	8,053
Heading—		
Tight...sets	321,765	126,527
Slack...do	22,078	2,594
Cooperage shooks—tight...do	11,555	29,651
Tight empty barrels, casks, and hogsheads...number	19,118	87,310

[1] The classification of this subgroup, "Creosoted, etc.," is subdivided into "Southern pine" and "Other." There being no exports under the first head, the "Other," therefore, means other than southern pine.

Wood and manufactures		Quantity	Value
Box shooks:			
Southern pine	board feet	23, 030	$900
Hemlock	do	15, 045	609
Spruce	do	97, 931	12, 849
Other	do	72, 460	5, 135
Veneers	square feet	25, 531, 832	613, 347
Plywood	do	9, 551, 646	358, 015
Parquetry or flooring strips under 2 feet long	M feet	1, 167	41, 558
Hardwood flooring	do	4, 258	326, 840
Doors	number	1, 704, 573	2, 803, 879
Sash and blinds	do	1, 628	1, 152
Trim and moldings	linear feet	329, 428	10, 505
Cane and reed manufactures, not elsewhere shown		----------	4, 375
Furniture		----------	124, 763
Boat oars and paddles	number	28, 223	79, 604
Handles:			
For agricultural and long handled tools	dozen	570, 422	544, 922
For striking tools	do	403, 121	449, 793
Pencil slats	pounds	2, 643, 150	406, 234
Woodenware		----------	143, 029
Other wood manufactures		----------	2, 369, 185
Grand total		----------	33, 258, 656

HANDLING WOOD IMPORTS AT BRISTOL

RATES FOR HANDLING WOOD GOODS, ROYAL EDWARD, AVONMOUTH, AND PORTISHEAD DOCKS, PORT OF BRISTOL, EFFECTIVE APRIL 2, 1928

[The Port of Bristol Authority]

REGULATIONS

Regulations regarding wood goods piled in the yard or in any of the sheds of the port authority or deposited upon their quays or premises, and conditions upon which the port authority are prepared to perform laborage operations within the limits of the docks.

1. Importers must supply the traffic manager with specification of cargo previous to goods being landed, and should send any delivery orders intended to be executed at the ex-quay rate before the vessel's discharge. or during the periods set out on page 9[1]. The balance of cargo not so dealt with will be treated under the prime rate. Each delivery order, upon a form issued by the port authority and accompanied by a consignment or shipping note, must be forwarded to the traffic office at the dock to be registered. No other form will be recognized. Supplies of these can be obtained upon application.

2. The port authority are desirous that it should be distinctly understood by all merchants and their agents at the port that the port authority are not responsible for the safe custody of any goods or merchandise that may be deposited upon or in any of their quays, warehouses, sheds, and premises; neither are they under any circumstances, or in any case whatsoever, answerable or accountable for, or liable to make good any loss or damage which may happen to any goods, wares, or merchandise, or to any vessel or property of any description, by shrinkage, waste, theft, fire, lightning, storm, or tempest, or from civil commotion, war, or any event not arising from the acts or willful negligence of their officers or servants while performing any laborage operation.

3. The port authority will not accept liability for deficiencies arising from natural causes, nor from loss or damage sustained by goods previously to landing, nor by goods taken into vessels by or discharged therefrom into lighters. The port authority will not be responsible for injury that may happen to goods or packages from improper slinging or hooking the same on board vessels, craft, or rafts, or to or from railway or other wagons by parties not in their employ; nor in any case for loss or damage of any description unless ascertained to have occurred whilst the goods were in the custody of the port authority for laborage operations and previously to their being removed from the port authority's premises and notice thereof given to the traffic manager.

4. The various orders for laborage upon the quays and premises of the port authority must be separate and distinct for each operation, and are to be paid for on demand, or the amount carried to the debit of the accounts of the respective parties, at the option of the port authority.

5. The port authority will use every means in their power to secure an adequate supply of railway trucks for the dispatch of goods, but they will not be responsible for any delay which may arise through the failure of the various railway companies, or owners of craft, to meet the merchants' requirements in these respects. When ex ship or quay deliveries can not be given, owing to the causes mentioned above, or to other causes not in the control of the port authority, prime rate will be charged.

6. The port authority may pass warehousing entries for such goods as the consignees shall neglect or refuse to enter within 48 hours from the time of the customhouse report; and the shipowner may enter and land goods which have not been entered but of which the consignee has failed to take delivery within the time prescribed by the Merchant Shipping Acts Amendment Act, 1862.

7. When laborage operations are performed by the port authority landing accounts will be rendered without extra charge. Applications relative to all such accounts to be made at the office of the traffic manager.

8. Persons possessing general authority in writing from merchants to inspect their goods should produce the same for registry at the office of the traffic manager.

---

[1] Reference to pagination of original copy; appears on p. 338 of this bulletin under section "Rates, charges, and rents."

9. The port authority will not be responsible for any delay, loss, or damage arising through combinations, strikes, or scarcity of workmen, or stress of weather, or any consequences arising therefrom.

10. The port authority are entitled to exercise a general lien on all goods deposited in their sheds or upon their premises, not only for the charges for dues, laborage operations, or rent incurred thereon, but also for the amount or balance of any account due to the port authority either in respect of these goods or of others previously landed or delivered for the same owners or agents.

11. The tables of rates and charges are subject to revision and alteration at any time without notice.

12. The port authority, in framing the foregoing regulations, reserve to themselves all rights and powers conferred on and invested in them by their various acts, and by the Harbors, Docks, and Pier Clauses Act, 1847, and the clauses of the Railway Clauses Consolidation Act, 1845, and by their general by-laws.

Any further information may be obtained on application to the general manager and secretary, Queen Square, Bristol.

By order of the Port of Bristol Authority.

REGULATIONS AS TO PAYMENT OF DUES AND CHARGES

The various charges are payable as follows:

Dues on ships.—Upon entry within the port.

Dues on goods inward.—Before the landing thereof.

Dues on goods outward.—Before shipment.

Labor charges.—On landing of goods.

Rent.—On delivery or transfer of goods and on all balances of stocks at the end of March, June, September, and December in each year.

Regular customers will, subject to approved application, be allowed ledger accounts of all charges except dues on their signing an undertaking to pay their balances monthly within 10 days of the rendering of a statement of accounts, and on the understanding that payment is not to be delayed for the settlement of any questions as to the accuracy of any particular account.

Except in cases where a merchant or trader has a ledger account or where charges have already been paid by the importer, a remittance for the amount payable under the appropriate rate must accompany all delivery orders. The port authority will not be responsible for any delay which may arise through failure to observe this regulation. When the services are of such a nature as renders payment in advance impracticable, the amount involved will be due on presentation of the account.

Checks should be made payable to the Port of Bristol Authority, and all dues and charges paid at the Dues Office, Queen Square, Bristol.

For the convenience of traders, delivery orders which need to be accompanied by check for charges may be forwarded direct to the Assistant Secretary, Docks Office, 19 Queen Square, Bristol.

TELEPHONE ORDERS

All orders sent by telephone should be confirmed in writing before the despatch of the goods, failing which such orders will only be acted upon at the risk of the owner of the goods.

RATES, CHARGES, AND RENTS

Quay rate[2] includes sorting (for dimensions or by country marks), stacking on quay and delivering to railway trucks or on to quay alongside craft. It only applies to goods for which delivery orders are received prior to arrival or during the time the vessel is discharging and provided the port authority have not removed the traffic from the quay prior to receipt of delivery orders. Merchants or receivers are requested to forward orders immediately.

Prime rate includes sorting (for dimensions or by country marks), piling in yard, and redelivering to railway trucks or onto the quay alongside craft.

Special rates will be quoted for whole bill of lading parcels intended for delivery ex ship direct to railway trucks. When it is practicable for this delivery to be given the number of pieces or bundles will be tallied if desired, but not measured. If, through any circumstances not within the control of the Port Authority, direct ex-ship delivery can not be given the goods will come under quay or prime rate, as the case may be.

---

[2] A special extension of time for the receipt of delivery orders in the case of certain sundry wood good shown on p. 11 [p. 339 of this bulletin] is in operation. Details can be obtained on application.

Rates for Handling Wood Goods, Royal Edward, Avonmouth, and Portishead Docks

Rate	European and American timber	Dues	Quay rate		Prime rate		Repiling	
			s.	*d.*	*s.*	*d.*	*s.*	*d.*
1	Deals and battens (2½ by 7 inches or equal and up) 9 feet and up per standard	2s. 3d. plus 10 per cent.	18	1	32	9	9	0
2	Scantlings (under the equal of 2½ by 7 inches) and ends under 9 feet per standard	do	25	5	40	10	9	0
3	Boards under 2 inches in thickness and above the equal of 1 by 6 inches, 6 feet and up per standard	do	24	0	43	0	12	0
4	Boards 1 by 6 inches or equal and under, 6 feet and up per standard	do	27	4	45	7	12	0
5	Strips, slating battens and cratewood (securely tied in bundles) per standard	do	22	6	42	10	12	0
6	Ceiling laths (tied in bundles) per load	1s. 3d. plus 10 per cent.	22	6	42	10	12	0
7	Parcels of ends, under 5 feet in length (tied in bundles) per standard	2s. 3d. plus 10 per cent.	31	8	60	6	12	0
8	Parcels of ends, under 5 feet in length (loose) per standard	do	45	0	70	0	16	0
9	All the above dimensions in birch, pitch pine, Douglas fir, hemlock, and silver spruce per standard	do	40 per cent extra to rates set out above.					

NOTE.—Rent per week: In open, 2¼d. per standard; in shed, 3¾d. per standard.

Sundry wood goods	Dues	Quay rate		Prime rate		Repiling	
		s.	*d.*	*s.*	*d.*	*s.*	*d.*
Cedar and all other furniture woods, not enumerated per ton	3s. plus 10 per cent.	11	4	19	9	6	4
Mahogany do	do	11	8	20	5	7	2
Walnut do	do	11	4	19	9	6	4
Satin walnut do	1s. 6d. plus 10 per cent.	11	4	19	9	6	4
Ash do	1s. 3d. plus 10 per cent.	11	4	19	9	6	4
Oak do	do	11	4	19	9	6	4
Maple flooring boards per load of 50 cubic feet	1s. 9d. plus 10 per cent.	13	0	20	5	7	2
Whitewood do	1s. 6d. plus 10 per cent.	11	4	19	9	6	4
Teak planks and boards per load of 40 cubic feet	1s. 3d. plus 10 per cent.	11	8	20	5	7	2
Log timber (ash, birch, elm, oak, teak, and all timber not before enumerated), per load of 50 cubic feet for light and 40 cubic feet for heavy.	do	10	0	13	8	5	4

NOTE.—Rent per week: In open, 1d. per ton or load; in shed, 1½d. per ton or load.

Extra Operations, Etc.

Stripping:	
Deals, etc	7s. per standard.
Boards	8s. 6d. per standard.

Operations not provided for will be charged for according to labor and materials expended.

All rates apply to labor operations during the ordinary working hours only; overtime will be charged according to the expense incurred.

When in delivering orders of one standard or less it is necessary to move the truck to various points on the dock lines a charge of 6d. will be made for each removal of the truck after the first delivery has been effected.

No liability for out-turn of cargo can be accepted until the landing is rendered.

Rent is charged from the mean date of discharging.

INDEX

Page

- Acacia, native, 20
- Acland report, 11
- Advertising, 32, 116, 121, 231
- Afforestation, 9, 11
- African mahogany, 137
  - auctions, Liverpool, 46
  - ports of shipment, 137
- African teak, 154
- African whitewood, 168
  - *See also* Obeche.
- Agencies, British, leading headquarter cities, 52
- Agencies for selling Russian lumber, 98
- Agents, 27, 51
  - agreements with, 53, 311
  - stave trade, 233
- Agriculture in Great Britain, 7
- Airplanes, manufacturing centers, 290
  - use of plywood, 294, 315
  - woods used, 290
- Alder, native, 20
  - textile machinery parts, 288
  - plywood, 316
  - plywood-panel cores, 295
- Amalgamated Society of Woodworkers, 306
- American branch offices, 29
- American representatives, 29
- American woods, ash, 145, 149, 258, 260
  - basswood, 162
  - beech, 164
  - California redwood, 120, 121
  - complaints, 324, 325
  - contract forms, 61, 63
  - cypress, 121, 288, 289, 291
  - Douglas fir, 111
  - educating the market, 330
  - elm, 237
  - exports of furniture stock to United Kingdom, 230
  - grading rules, 81
  - hemlock, west coast, 122
  - hickory, 162
  - importance of British market, 26
  - maple, 158
  - market in Belfast, 50
  - market in Bristol, 49
  - methods and terms of sale, 53
  - oak, 127, 172, 180, 186, 215, 228
  - pine, southern, 106, 109, 111
  - pine, white and sugar, 118
  - poplar, 135
  - prospects in pattern-making industry, 293
  - value of shipments to United Kingdom, 26
  - walnut, 155
- Apartment-house construction, 211
- Apitong, 165, 182
- Arbitration clause in contracts, 57, 59, 62, 63, 64
- Arcos (Ltd.), Russian selling agency, 132
- Area, British Empire, 8
  - United Kingdom, 1, 2

Page

- Ash, 145
  - airplane parts, 291
  - American, criticism, 260
  - American, in British motor-vehicle industry, 258
  - American, suggestions to exporters, 149
  - billiard cues, 287
  - central European, 149
  - central European, competition from, 320
  - cricket wickets and bails, 286
  - croquet-mallet handles, 287
  - England and Irish Free State, 148
  - hockey sticks, 287
  - in automobile manufacture, 260
  - in motor-truck construction, 259
  - Japanese, 149
  - logs, 147
  - native British, uses, 19
  - Polish, 148
  - Polish, in automobile manufacture, 262
  - polo mallets, 287
  - Russian, 149
  - Siberian, plywood, 317
  - specifications for furniture industry, 147
  - tennis rackets and net posts, 286
- Aspen, plywood, 317
- Association of Timber Importers, 31
- Athletic equipment, woods used, 285
- Auctions, 17, 85
  - mahogany, 46, 140
- Australian hardwoods, 167
- Austria, door-manufacturing industry, 300

- Bagac. *See* Apitong.
- Balls, polo, 287
- Balsa, 125, 291
- Baltic region as source of softwoods, 100
- Bamboo fishing rods, 287
  - polo balls, 287
- Bank-building construction, 211
- Bank fittings, 268
- Barges, 257
- Barrel heading, 232, 236
- Barrel hoops, elm, 233, 237
- Barrel industry, Liverpool, 46
- Barrels, cement, 241
  - china-clay, 244
  - dry-chemical, 244
  - empty, new, 236
  - empty, secondhand, 233, 236, 240, 242, 243
  - factors affecting market, 249
  - flour, 242
  - glucose, 242
  - herring, 240
  - kerosene, 240
  - market affected by motor transportation, 249
  - packing-house products, 242
  - substitutes making small headway, 250
  - whisky, 243

Page

- Barry. *See* Cardiff.
- Basswood 162
  - native 20
  - use in piano keyboards 283
- Battens, dimensions 87
  - slating and tile 206
- Bedsteads. *See* Furniture.
- Beech 20, 164
  - European, competition from 320
  - European, in motor vehicle construction 258
  - flooring 175
  - furniture 225
  - gymnastic equipment 287
  - piano manufacture 284
  - tennis-net posts 286
  - textile machinery parts 288
  - uses 20
- Belfast as a lumber port 50
- "Bellywood" for pianos 283
- Bends for motor vehicles 260
- Billets 21, 131
- Billiard requisites 285, 287
- Bills of lading 73
  - *See also* Contracts; Charters.
- Birch, Canadian, for textile machinery parts 288
  - Canadian, "lower port" 160
    - "Quebec" 160
  - dimensions in demand 160
  - European, for plywood-panel cores 295
  - Finnish 161, 288
  - flooring 175
  - furniture 225
  - native 20
  - plywood, sources and uses 315
  - prices 161
  - spool and bobbin wood 290
  - uses 161
- Birkenhead as a lumber port 47
- Block flooring. *See* Flooring blocks.
- Board ends 199
- Boards, dimensions 87
- Boat hooks 205, 206
- Bobbin wood, birch 290
  - dogwood 288
  - maple 288
- Booms and yardarms 256
- Borneo cedar 166
- "Boules" or butt-cut logs 131
- Bowls 287
- Box manufacture 279
- Box shooks 280
  - American participation in market 281
- Boxwood, croquet mallets 287
  - shuttles 288
  - spinning-frame bosses 289
  - textile machinery parts 288
- Branch offices, American 29
- Branding 83
  - doors 307
- Branding flooring 172
- Brewers as producers of cooperage 246
- Brewing industry as consumer, of cooperage 237, 246, 248.
- Bridge construction and repair 218
- Bristol, as a lumber port 49

Page

- British Empire, area 8
- Brokers 27
- Broom-handle squares 197
- Builders' woodwork, growing demand 298
  - moldings 309
  - trades unions 306
- Building and loan societies 210
- Building construction, use of plywood 313
  - wood consumption 208
- Burma, teak shipments 151
- "Buy Empire goods" campaign 328

- Cabinet planks, oak 128
- Cabinet ware, imports 322
- California redwood. *See* Redwood.
- Caliper measure for round logs 82
- Canada, as source of British lumber supply 34
  - Douglas fir 115
  - elm 165
  - oak 132
- Canal transportation in Great Britain 4
- Canals, mileage 5
- "Cantel" 239
- Car building for railways 214
- Cardiff as a lumber port 48
- Casks, for distilling industry 243
  - palm-oil 239
  - secondhand 236, 239
- "Cat faces" in whiskey staves 243
- Cedar, Borneo 166
  - Honduran 166
  - native 20
  - New Zealand white 168
  - pencil 166, 297
  - Port Orford 119, 292
  - Spanish 165, 288
- Cement barrels 241
- Cements used in plywood manufacture 318
- Central American mahogany 138
- Central Europe as source of wood supply 34
- Central European lumber, sales terms 54
- Central European softwoods 103
- Chair industry 221
- Charters, standard forms 65
- Chemicals, containers for dry products 244
- Cherry, native 20
- Chestnut 163
  - uses in Great Britain 19
  - wormy, used in piano cases 283
- China-clay barrels 244
- Churn staves 242
- C. i. f. contracts, shippers' liability 80
- "Cill" planks 128
- Claims 79
  - improper seasoning as basis 325
  - prompt settlement desirable 327
  - squares for furniture industry 229
  - staves 234
- Climate, Great Britain 1
- Closet lining, cedar 167
- Coal, British production 6, 192
- Cocus wood for wood wind instruments 284
- Coffin oak 129
- Coffins, principal woods used 293
- Colliery ties 191

Page

- Commerce, United Kingdom 2
- Competition in British market 21, 320, 324
- Complaints, American ash 260
  - American floor blocks 182
  - American hardwood lumber 325
  - American staves 249
  - American softwood 324
  - American southern pine 111
  - Douglas fir 114
  - paving blocks of Douglas fir 324
  - hardwood flooring 175
  - improper seasoning 325
  - oak dimension stock 195
  - wormy stock 196
- Concrete forms 211
- Conifers, planting program 10
- Consignments 84
  - staves 235
- Construction, heavy 211
- Containers, plywood 314, 320
- Contracts, c. i. f., shippers' liability 80
  - standard form, American hardwoods 61
    - American pitch pine 63
    - American softwood 62, 63
    - European softwoods 55
    - plywood 310
  - standardization of 55
  - staves 234
  - stipulations to be avoided 79
  - supplying lumber to railroads 212
  - supplying telegraph poles 202
- Cooperage, British production 245
  - imports 230
  - industry 232, 244
  - manufacture by consuming industries 246
  - "Memel," standard dimensions 237
  - production by brewers 246
  - seasoning before delivery 243
  - sources of supply 231
  - tight 236
  - trade organizations 246
- Coopers' Federation of Great Britain and Ireland 247
- Coppice trees 17
- Cottonwood 164
- Coverage, contract requirements 74
- Cradles for ship launchings 253
- Crate production 279
- Cricket-bat willow 285
- Crop acreage and production 7
- Croquet mallets 287
- Crossings. *See* Switch ties.
- Crossties. *See* Ties.
- Custom sawing and planing 21
- Customs string measure 82
- Cypress, spinning frame troughs 288, 289
  - United States exports to United Kingdom 121
  - uses in British market 121
- Czechoslovakia, softwoods 105

- Damage, recoverage. *See* Insurance.
- Deals 199
  - Canadian pine, specifications and prices 124
  - dimensions 87
  - Rio pitch pine 109, 110
- Decking for ships 253

Page

- Delivery wagons, railway 219
- Desks. *See* Furniture.
- Dimension stock, chief complaints 195
  - claims 229
  - consumption by furniture industry 228
  - hardwood 195
  - outlook for American participation 196
  - softwoods 196
  - species used 195
  - uses 195
- Discolored stock, separate shipment 326
- Distilling industry, cooperage consumption 243
  - cooperage production 246
- Dock construction 275, 278
- Dogwood, shuttles and bobbins 288
  - uses 169
- Dolly-tub staves 242
- Dominion participation in British lumber trade 36
- Doors 266
  - branding marks 307
  - British manufacture 301
  - casement 305
  - construction and patterns 301
  - desirable features 307
  - finish 306
  - garage 304, 305
  - hospital 304, 314
  - inside 305
  - market outlook 308
  - outside 303, 305
  - plywood, for hospitals 314
  - sales methods and prices 306
  - sources of supply 299
  - stock, common sizes 305
  - store entrances 268
  - trade-unions 306
  - transshipment charges 308
  - vestibule 303, 305
- "Double wrack" stock, Sweden 93
- Douglas fir, barge construction 257
  - Canadian competition 115
  - complaints 114
  - demand increasing 111
  - dimensions preferred 112
  - dock construction 277
  - doors 299
  - exports from United States to United Kingdom 112
  - flooring blocks 181
  - handling of imports 113
  - house construction 327
  - market affected by shipments of Russian pine 99
  - market outlook 116
  - millwork 263
  - paving blocks, criticism 324
  - plywood 295, 312, 316, 321
  - preference for Dominion product 37
  - price fluctuations a handicap 115
  - principal uses in Great Britain 113
  - railway ties 189
  - railway-car construction 217
  - sales terms 113
  - ship decking 254
  - shoring poles 252
  - staves 242

Page

- Douglas fir, varied designations confusing, 116
  - weavers' and cloth beams, 288, 289

- Eastern European lumber, sales terms, 54
- Ebony, use in manufacture of musical instruments, 284
- Educating the market, booklets, 330
  - exhibits, 332
  - public press, 331
- Egg crates, plywood, 314. 315
- Elm, 165
  - barge construction, 257
  - coffin making, 293, 294
  - dock construction, 277
  - hoops, 233, 237
  - lifeboats, 257
  - uses in Great Britain, 19
- Empire Marketing Board, 37, 328
- End-matched lumber, 327
- Ends, Canadian pine, 124
  - dimensions, European, 87, 199
  - pine and spruce, European, 97
- English Joinery Manufacturers' Association, 264
- Estonia, softwoods, 103
- Europe as source of British wood supply, 33
- European competition, 21
- Exhibitions, annual, by furniture industry, 229
  - educational possibilities, 332
- Exports, total value, United Kingdom, 2

- Facias for stores, 268
- Factories, millwork, 264
- Factory construction, 211
- Factory lumber, Sweden as source of supply, 92
- Fancy woods, 44
  - hardwoods, prices, 54
- Fathom, 39, 194. 200
- Federated Home-Grown Timber Merchants' Association, 16
- Finland, birch, 161
  - imports from, 90
  - planing-mill industry, 90
  - staves, 232
- Fir, Scotch, 20
  - staves, 230, 236
  - trade usage, 88
  - *See also* Douglas fir.
- Firewood, 199
- Fisheries, 7
- Fishing tackle, 287
- Flitch, definition, 44
- Flooring, beech, 175
  - birch, 175
  - block, 177
    - criticism of American product, 182
    - handicaps to extensive use, 183
    - import and distribution methods, 178
    - in factories, 273
    - method of laying, 180
    - oak, 180
    - sources, 178
    - types and sizes, 179
    - woods used, 180
  - branding, 172
  - hardwood, complaints, 175
  - imports, 171
  - kinds in demand, 170

Page

- Flooring, maple, 174
  - oak, American, 172
    - Austrian or Slavonian, 173
    - Japanese, 173
    - method of laying, 173
  - parquetry, method of laying, 185
  - pine, southern, 172
  - plywood, 321
  - prices, 171, 172
  - short-length, 328
  - softwood, European, 171
  - sources, 170
  - specifications, 172. 173. 174
- Flour barrels, 242, 250
- Forest Products Research Board, 13
- Forestry, funds expended under forestry act, 11
  - number of employees, 11
  - research, 13
- Forests, area in British Empire, 8
  - area in United Kingdom, 9
  - maintenance, 9
- Freight charges, American southern pine, 108
  - Finnish softwoods to British ports, 92
  - Sweden to British ports, 93
  - *See also* Contract forms; Charters.
- Furniture, antique, 225
  - bedroom, 222
  - dining room, woods preferred, 221
  - exhibitions, 229
  - fashions and tendencies, 220
  - imports, 321
  - industry, dimension stock consumption, 228
    - importance to American exporters, 230
    - leading centers, 47, 221
  - inexpensive, principal woods used, 225
  - kitchen, 225
  - lumber, moisture content, 228
  - market outlook, 229
  - office, 226
  - plywood, 313. 320
  - school, 226
  - upholstered, 225
  - woods, 41, 44
- Gabon mahogany. *See* Okoumé.
- Germany, as a source of stave supply, 231
  - softwoods, 106
- Glasgow as a lumber port, 48
- Glucose barrels, 242
- Golf clubs, 286
- Grade marking, 83
  - north European softwoods, 88
  - Russian softwoods, 96
- Grading, American southern pine, 109
  - north European softwoods, 88
  - plywood, 311
  - Russian softwoods, 94
- Grading rules as basis of sales, 81
- Gramophones, 284
- Grants to promote afforestation, 12
- Greenheart, 167
  - dock construction, 277
  - fishing rods, 287
- Grimsby as a lumber port, 48
- Gum, blue, 167
  - complaints, 134
  - discoloration, 135
  - red, 134, 225

Page

- Gum, sap, 134, 225, 293
  - staves, 232, 236, 242, 250
- Gurjun, 182

- Hand trucks for handling freight and baggage, 219
- Handles, croquet mallets, 287
  - description and sizes of materials, 219
  - tool, imports, 322
- Harbor construction, 275
- Hardwood Legal Protection Association, 31
- Hardwood, American, exports to United Kingdom for furniture industry, 230
  - American, standard contract, 61
  - Australian, 167
  - central European, increasing competition, 320
  - criticism of American lumber, 325
  - doors, 301
  - fancy, handling of, 30
  - interior trim, 264
  - lumber, measurement of, 81
  - native, miscellaneous, 20
  - paving blocks, 272
  - Philippine, 165
  - planting program, 10
  - price quotations, 54
  - staves, 232
  - tropical, store fittings, 270
- Hazel pine. *See* Gum, sap.
- Heading, barrel, 236, 241, 242, 243, 244
  - palm-oil cask, 239
- "Headstocks," in car building, 128
- Hemlock, west coast, 122
- Herring barrels, 240
- Hickory, 162
  - golf clubs, 286
  - picker sticks, 288
- Hockey sticks, 287
- Hogsheads, 237, 244
- Holly, native, 20
- Hoops, elm, 237
- "Hoppus" system of measurement, 82, 142
- Hornbeam, native, 20
  - piano-action parts, 283
- Houses, building costs, 209
  - materials used in construction, 210
  - number built, 209
  - postwar shortage, 208
  - ready-cut, 211
  - use of Douglas fir, 327
  - wood consumption in building industry, 208
- Hull as a lumber port, 47

- "Importer-merchant," use of term, 29
- Importers, 28
- Imports, 35, 36
  - Australian hardwoods, 167
  - by ports of entry, 50
  - character, 26
  - factors influencing trade, 51, 298
  - from Finland, 90
  - from Sweden, 92
  - handling shipments at port of London, 39
  - leading articles, United Kingdom, 3
  - mahogany, 137

Page

- Imports, method of handling doors, 306
  - method of handling lumber, 51
  - method of handling mahogany, 140
  - method of handling parquetry, 186
  - method of handling plywood, 310
  - method of handling staves, 233, 235
  - oak, 127
  - organization, 27
  - softwoods, central European, 104
    - eastern Europe, 100
    - Estonian, 103
    - Rumanian, 104
    - Russian, 94
  - teak, 151
  - total value, 2
  - unmanufactured wood, value, 26
- Income tax liability of foreign firms, 29
- Industries, Hull, 47
  - Liverpool, 46
  - Manchester, 47
  - United Kingdom, 5
- Inspection of lumber, rules governing, 81
- Insulation for refrigerator vessels, 256
- Insurance clauses in contracts, 56, 59, 60, 62, 73
- Insurance, "open" form of policy, 74
  - particular average adjustment, 74, 76
  - typical policy, 75
- Interior trim, 264, 266
- Iroko or African teak, 154

- Japanese ash, 149
- Japanese lumber, grading, 81
- Jarrah, 167, 168, 182
  - competition with American oak, 133
  - dock piling, 277
  - railway-car construction, 215

- Karri, 167, 168
  - competition with American oak, 133
  - dock piling, 277
  - railway-car construction, 215
- Kedar, for pattern making, 292
  - *See also* Pine, Siberian.
- Keel blocks, 253
- Kerosene containers, 240
- "Keys" for wedging rails, 213
- Kiln-dried saps, 109, 110
- Kitchen dressers, 266

- Laboratory work in forest products, 13
- Lacrosse equipment, 287
- Ladders, 219
- Laminated deals in heavy construction, 110
- Lancewood, for textile machinery parts, 288
- Land holdings, 7
- Larch, lifeboats, 257
  - railway-car building, 217
  - Russian, 98
  - shoring poles, 252
  - uses, 20
- Lath, dimensions, 198
- Latvia, leading lumber ports, 100
  - lumber grades, 101
  - manufacturing of lumber for British trade, 100
  - prices for softwood, 101

Page

- Latvia, short lengths 101
  - staves 231
- Lifeboats 257
- Lignum-vitæ, bowls 287
  - cotton gins and polishing sticks 288
  - propeller bushing 256
- Lime 20
- Literature, technical and informative, lack of 330
- Lithuania, as source of British lumber supply 103
  - staves 231
- Liverpool, as a distributing center 46
  - as a lumber port 43
  - as mahogany port 139
  - industries 46, 237
  - mahogany auctions 140
- Liverpool Produce Association specification, palm-oil casks 239
- Liverpool string measure 82
- Llimo 168
- Load, defined 39, 44, 50
- Locust, native 20
- Logs, ash 147
  - measurement 82
  - yellow poplar 136
- London, as a lumber port 37
  - as mahogany port 140
- London Worshipful Company of Coopers 245
- Lumber, car-building, specification and quality 215
  - classes and sizes 87
  - dressed, imports 176, 177
  - imports, method of handling 51
  - matched, imports 176
  - measurement of 81
  - purchase by railroads 212
  - sources of British supply 33
- Lumber exchanges 32
  - Liverpool 47
  - London 43
- Lumber trade press 32

- Magnolia 163
- Mahogany 136
  - African 137
  - African and Central American, prices 142
  - auctions at Liverpool 140
  - bank and office fittings 268
  - billiard tables 287
  - Borneo 139
  - Brazilian 139
  - Central American, for pattern making 292
  - Cuban 139
  - dining-room furniture 221
  - Gabon. *See* Okoumé.
  - import trade methods 140
  - imports 137, 140
  - logs, imports at Liverpool 140
  - logs, imports at London 140
  - lumber, imports, qualities and sources 144
  - measurement 141
  - Peruvian 139
  - piano cases 283
  - plywood panels 295
  - ports of entry 139
  - principal uses 143
  - radio cabinets 296
  - railway-car construction 215

Page

- Mahogany, sales unit 141
  - seaplane floats 291
  - sources 137
  - store fittings 270
  - textile machinery 288
  - timber and logs, imports 137
  - use in shipbuilding 255
- Manchester as a lumber port 47
- Manchester Ship Canal 4
- Manufacturing industries, British 6
- Maple, bird's-eye, interior finish of ships 255
  - central European, competition with American product 330
  - flooring 174
  - flooring blocks 181
  - hard 158
    - billiard cues 287
    - frame rollers and bosses 289
    - gymnastic equipment 287
    - musical instruments 283, 284
    - principal uses 159
    - textile machinery parts 288
  - lumber, specifications 158
- Margarine-box shooks 281
- Marine insurance. *See* Insurance.
- Market methods 53
- Market outlook, general summary 332
- Marking. *See* Grade marking.
- Marquetry 296
- Masts for ships 256
- Matched lumber, imports 176
  - prices 176
  - softwood 175
- Measurement, lumber, timber, and logs 37, 81
  - mahogany 141
  - pit props 194
  - plywood 312
  - system used 21
- Memel cooperage, standard dimensions 237
  - staves 237, 248
- Memel reduction table 237
- Merchants 29
- "Mill run" quality, Poland 102
- Millwork, doors 266
  - factories, equipment 264
  - interior trim 266
  - kitchen dressers 266
  - miscellaneous 266
  - molding 266
  - principal woods used 263
  - purchasing methods 264
  - trade organization 264
  - window sash and frames 265
- Minerals, native 6
- Mining 6
- Mining timber 192, 297
- "Mission" style oak furniture 222
- Moisture content of furniture lumber 228
- Moisture in lumber, effect on transportation charges 326
- Moldings 266, 305, 309
- Motion-picture industry, use of plywood 314
- Motor transportation, effect on market for barrels 249
- Motor vehicles, import duty 258
  - manufacture 257, 314

Page

- Musical instruments, exports 282
  - manufacture 282
  - phonographs 284
  - pianos 283
  - stringed instruments 284
  - wood wind 284

- National Federation of Building Trades Employers 306
- National Federation of Employers of Coopers 246
- National Joint Industrial Council 247
- Native timber 16
- Newcastle-on-Tyne as a lumber port 49
- New Zealand, cedar, white 168
  - hardwoods 168
- Newspapers as advertising medium for woods 331
- Nicaraguan cedar 166
- North European lumber, imports 33
  - methods of and terms of sale 54
  - softwoods 86
- Norway, as source of softwood lumber 99
  - staves 232

- Oak 126
  - American 127, 180, 186, 215, 228
  - barge construction 257
  - barrels 236
  - billiard tables 287
  - Canadian 132
  - coffins 293
  - dimension stock 129
  - dining-room furniture 222
  - European, competition from 21, 320
  - flooring 172, 173
    - block 180
    - parquetry 186
  - imports 127
  - interior finish of ships 255
  - Irish Free State 132
  - Japanese 130
  - lifeboat construction 257
  - market outlook 133
  - native 18, 132
  - organ cases 284
  - piano cases 283
  - plywood, kinds and uses 317
  - plywood panels 295
  - Polish 129
  - radio cabinets 296
  - railway-car construction 215
  - Rumanian 132
  - Russian 131
  - school desks 228
  - shooks, for packing pickled meat 242
  - Slavonian 130
  - specifications 128
  - staves 230, 237, 249
    - palm-oil cask 239
    - vinegar barrel 242
    - whisky barrel 243
  - store fittings 270
  - Tasmanian 168
  - Volhynian 129
  - wainscot 131
- Obeche 168

Page

- Office construction 211
- Office fittings 268
- Okoumé 137, 138
  - characteristics 143
  - plywood 255, 316
  - plywood-panel cores 295
- Omnibuses 259
- Oregon pine. *See* Douglas fir.
- Organs 284
- Overgrade shipments inadvisable 80

- Pacific Lumber Inspection Bureau (Inc.) 113
- Packing cases, Manchester 47
  - production 280
- Packing for shipment, doors 303
  - knock-down radio cabinets 296
  - parquetry 184
  - pencil cedar 297
  - plywood 313
- Packing-house products, containers 242
- Palm-oil barrels, Liverpool 46
- Palm-oil industry as consumer of staves 237
- Panel wood, imports 197
- Paneling, in interior trim 266
  - use in banks 268
- Panels, plywood 295
- Park trees 17
- Parquetry 183
  - marketing methods 186
  - methods of laying 185
  - packing for shipment 184
  - patterns 185
  - prices 184
  - source of imports 184
  - store window floors 270
- Pattern-making woods 218, 292
  - prospects for American species 293
- Paving blocks, wood 271
  - Douglas fir, criticism 324
- Pearwood, use in piano cases 283
- Penarth. *See* Cardiff.
- Pencil cedar 166, 297
- Pencil manufacture 297
- Periodicals devoted to lumber trade 32
- Pernambuco wood for violin bows 284
- Persimmon 169
  - golf-club heads 286
  - loom shuttles 288
- Petrograd standard defined 39
- Philippine hardwoods 165
- Phonographs 284
- Pianos, woods used 162, 283
- Picker sticks 288
- Pickled-herring industry, cooperage production 246
- Pine, Baltic, switch ties 192
  - Bosnian, as competitor of American southern 106, 110
  - California sugar, for pattern making 292
  - Canadian 124, 256, 284, 287, 289, 290, 292
    - prices 124
    - principal uses 124
    - specifications 124
  - central European, principal uses 104
  - east European 100
  - Estonian 103

Page
Pine, European, flooring blocks 181
    railway ties 189
    railway-car construction 215, 217
  Finnish, uses 90
  flooring 171
  hazel. *See* Gum, American sap.
  Kara Sea district 98
  kauri 168
  lath 198
  millwork 263
  North Carolina, for coffin making 294
  north European, in barge construction 257
  pattern making 218
  paving blocks 272
  piano sounding boards 283
  pitch. *See* Pine, southern.
  Polish 102
  "Quebec yellow." *See* Pine, Canadian white.
  red 125
  Russian, effect on demand for Douglas fir 99
    prices 97
    principal uses 96
  Scotch. *See* Fir, Scotch.
  short lengths 199
  Siberian 126
  southern 106
    barge construction 257
    British import centers 109
    competitive species 110
    complaints 111
    dock construction 110, 275
    flooring 172
    flooring blocks 181
    grading rules 109
    ocean freight rates 108
    position in British market 106, 111
    principal uses in Great Britain 109
    school desks 228
    ship decking 253
    specifications 109
    standard contract 63
  staves 230, 236
    cement containers 241
    chemical barrels 244
    herring barrels 240, 241
  sugar 118
  Swedish and Norwegian, for plywood 317
  Swedish, for doors 301
  Swiss, manufacture of stringed instruments 284
  trade designations 86, 90, 94
  western 118
  western wany 125
  western white, for pattern making 292
  white 119, 254
  Yugoslav 106
Pit props 48, 193, 194
Pitch pine. *See* Pine, southern.
Planchette ends 199
Planing equipment in millwork factories 265
Planing mill industry in Finland 90
Planing-mill products 170
Planting program of forestry commission 10
Plywood, agency agreements 311
  airplane construction 315
  alder 316

Page
Plywood, American, market outlook 321
  as plaster substitute 320
  aspen 317
  birch 161, 270, 291, 294, 315
  building construction 313
  cements used 318
  cinema and theatrical scenery 314
  containers 314, 320
  contract, standard form 310
  crossbanding 312
  Douglas fir 256, 316, 321
  flooring 321
  furniture 313, 320
  grading rules 311
  imports 309, 315
  market outlook 320
  marking 313
  metal-faced 295
  method of construction 312
  motor-vehicle manufacture 259, 262, 314
  oak 317
  okoumé 255, 316
  overproduction 320
  panels 295
  piano manufacture 283
  pine, Swedish and Norwegian 317
  prices 317
  shipbuilding industry 256, 314
  Siberian ash 317
  sizes and construction 312
  sources 309
  store fittings 315
  trade organizations 319
  uses 294, 313, 315
  weight 313
Plywood Development Association 319, 320
Poland, as source of ash 148
  as source of oak 129
  as source of staves 231
  prices for softwoods 102
  tie shipments to Great Britain 188
Poles, hop 206
  ordinary 205
  prices 206
  principal ports of shipment 205
  shunting 219
  specifications 206
  telegraph 201, 202, 204, 218
  uses 201
Poling boards 198, 200
Polish softwoods, British imports 102
Polo equipment 287
Poplar, black Italian 20
  Lombardy 20
  native, textile machinery parts 288
  uses in Great Britain 20
  yellow 135, 136
    airplane instrument boxes 291
    interior finish of ships 255
    piano cases 283
    radio cabinet baseboards 296
    textile machinery parts 288
    weavers' beams 289
Population, British Isles 2
Port charges, Bristol 337
  Liverpool 43
  London 39

Page
Port of London Authority 37
Ports of entry, lumber 37
  mahogany 139
  railway ties 189
  teak 152
Ports exporting poles 205
Ports exporting Russian staves 231
Ports, Rumanian, for lumber shipment 105
Pottery containers 244
Preston as a lumber port 49
Prices, birch 161
  cedar, Spanish 166
  deals, siding, and ends, Canadian pine 124
  doors 306
  firewood 200
  flooring 171, 172
  fluctuations detrimental to ash trade 149
  fluctuations handicap Douglas fir 115
  mahogany, African and Central American 142
  matched lumber, Norway 176
  parquetry floors 184
  paving-block stock 272
  pine, Canadian 124
  pit props 194
  plywood 317
  poles 206
  quotations, currency units 54
  railway ties 191
  shelving boards, Norway 177
  short lengths 200
  softwoods, European "unsorted" quality 91
    Finnish 91
    Latvian 101
    north European 88
    Polish 102
    Rumanian 105
    Russian 97
    Swedish 93
  spruce, Canadian 123
    Czechoslovak 106
  staves for herring barrels 241
  switch ties 192
  teak 153
  walnut, African and French 157
    English 158
Proceed-sharing schemes in afforestation 11
Publications pertaining to lumber trade 32
Putlogs, birch 162

Quebec spruce. *See* Spruce, Canadian.

Radio cabinets 296
Railroads as lumber consumers 211
Railway cars, freight, woods used 215
  passenger, woods used 215
  standard coal car 216
  underframe parts, terms defined 217
Railway stations, maintenance materials 218
Railways, Great Britain 4, 5
Rainfall, Great Britain 1
Rates for sawing and planing 22
Rattan, for polo mallets 287
Redwood, California, efforts to reintroduce 120
Research, forest products 13
Rickers 205, 206

Page
Rio pitch pine deals 109, 110
Risks in transit to place of shipment, insurance against 77
Roofing 210
Rosewood 283, 284
Roundwood 198
Rumania, oak 132
  principal lumber ports 105
  softwoods, British imports 104
    prices 105
Rummaging, defined 42
Russia, ash 149
  British imports from 94
  lumber sales agencies 98
  lumber sales terms 54
  oak 131
  shipping districts for softwoods 94
  staves 231

Sailing vessels 257
Sales contracts 55
Sanding machines in millwork factories 265
Sarawak cane 286
Satin walnut. *See* Gum, red.
Satinwood, piano cases 283
  spinning-frame bosses 288
Sawing and planing rates 22
Sawing methods, native timber 17
Scaffolding 211
Scantling ends 199
Scantlings, dimensions 87
  Norwegian "wany" 99
Scribner-Doyle rule 82
Seasoning, importance 325
  laboratory research 14
Sequoia. *See* Redwood.
Shelving boards 176
Shelving, ship's pantries 256
  store 270
Shingles 207
Ship tonnage, steam and motor 251
Shipbuilding 250
  Glasgow 48
  principal uses of lumber 252
  use of plywood 314
  woods used in various types 252
Shipping, districts for Russian softwoods 94
  season for northern Europe 89
  season for Russian softwoods 94
Shipping, total tonnage, United Kingdom 4
Shipyards, British, location 251
Shooks, American oak, for pickled-meat containers 242
  Latvian 100
  slack, for flour barrels 242
  soap-box 281
  tight 236
  See also Cooperage.
Shoring 252
Short lengths 199
  box and crate industry 279
  flooring 328
  Latvia 101
  percentage permitted in shipments of European softwoods 87
  prices 200

Page
Short softwoods, Russian 95, 97
    utilization in Europe 201
    radio cabinet construction 296
Show cases for stores 270
Shunting poles 219
Shuttle wood 288
Siding, Canadian pine, specifications and prices 124
Silver spruce. *See* Spruce, Sitka.
Sitka spruce. *See* Spruce.
Sleepers. *See* Ties.
Softwood, American, criticism 324
    American, contracts governing sale 62
    central European 103
    Czechoslovak 105
    definition of contents, port of London 39
    doors 300
    European 87, 90, 91
        standard contract form 55
    Finnish 90
        freight rates to British ports 92
        prices 91
        principal demand in Great Britain 90
    flooring blocks 181, 182
    imports, from central Europe 104
        from eastern Europe 100
        from Estonia 103
        from Finland 90
        from Germany 106
        from northern Europe 87
        from Poland 102
        from Rumania 104
        from Russia 94
        from Sweden 92
    interior trim 264
    Latvian, grades and prices 101
    lumber measurement 81
    matched lumber 175
    north European 86
        grades 87, 88, 89
        prices 88
        specifications 87
    Norwegian 99
    Polish, grades 102
        prices 102
    price quotations 55
    principal species used in United Kingdom 86
    Rumanian, prices 105
    Russian, grading 94, 99
    Russian, prices 97
    Russian, principal uses 96
        shipping season and shipping districts 94
        short lengths 95
        sizes 95
    sources of supply 33
    Swedish, freight rates to British ports 93
        prices 93
        sizes in typical cargo 93
    White Sea district, qualities and sizes 95
    Yugoslav 106
Southern pine. *See* Pine.
Spanish cedar 165
Specifications, American southern pine 109
    British, compliance with 326
    Canadian pine 124
    Douglas fir 112
    in contracts 58, 61

Page
Specifications, oak 128
Spinning-frame troughs 289
Spool wood, birch 161, 290
Sporting goods 285
Spruce, airplane construction 117, 290
    Bosnian, characteristics 106
    Canadian 122, 277
    central European, principal uses 104
    Czechoslovak 105, 106
    dock construction 277
    doors 300
    east European 100
    Estonian 103
    flooring 171
    herring barrels 240
    lath 198
    millwork 264
    native, uses 20
    omnibus construction 259
    piano sounding boards 283
    Polish 102
    Russian, principal uses 97
    shipbuilding industry 252
    short lengths 199
    Sitka 117, 259, 290
    staves 230, 232, 236
        cement container 241
        chemical barrel 244
        herring barrel 241
    West Virginia 123
    White Sea district 97, 252
    Yugoslav 106
Staging in shipbuilding industry 252
Stations, railway, lumber for maintenance and renewals 218
Staves 34
    American 232
    American, complaints against 249
        outlook in British market 248
        quotations 234
        sales basis 235
        shipping points 233
    cement container 241
    china-clay barrels 244
    claims 234
    consumption by brewing and palm-oil industries 237
    Douglas fir 242
    dry-chemical barrel 244
    dry-fish barrel 241
    Finland 232
    fir, pottery containers 244
    gum 232
    gum, for glucose barrels 242
    hardwood 232
    herring-barrel 240
    importers 235
    imports since armistice 230
    Latvian 231
    Lithuanian 231
    "Memel" 232, 237
    methods in import trade 233
    Norway 232
    oak, whisky barrel 243
    palm-oil cask 237, 239
    Poland 231
    Russia 231

Page
Staves, sales contracts 234
    slack 236
    small cooperage 242
    spruce 232
    Sweden 232
    terms of sale 234
    trade associations representing 235
    vinegar barrel 242
    See also Cooperage.
"Stone" oak 129
Storage, public facilities for lumber, port of London 39
Store fixtures and fittings 268
    use of plywood 315
Stringed instruments, woods used in manufacture 284
Strips, pine and spruce, White Sea district 96, 97
Subsidies, as stimulus to building industry 208, 332
Substitutes for wood, competition from 267
Sugar-box shooks 281
Sweat damage, insuring against 77
Sweden, as source of supply for doors 300
    imports from 92
    leading factory lumber districts 92
    staves 232
Switch ties 191, 192
Sycamore, croquet mallets 287
    European, in manufacture of stringed instruments 284
    interior finish of ships 255
    textile machinery parts 288
    uses 20

Talking machines 284
Tea chests, plywood 314, 315
Teak 150
    African 154
    deckhouses and rails in shipbuilding 256
    flooring 182
    imports 151
    "keys" used in laying rails 154
    prices 153
    principal ports of entry 152
    principal uses 153
    railway-car construction 215
    ship decking 253
    specifications and qualities 152
    store fittings 270
    textile machinery parts 288
Telegraph and telephone poles 201
Tennis rackets 286
Tenoning and mortising machines in millwork factories 265
Textile industry, United Kingdom 6
Textile machinery, principal woods used 287
Ties 187, 213
    American, market outlook 192
    colliery tramways 189, 191
    creosoting 187
    Douglas fir 189
    European pine 188
    import methods 189
    imports 187
    ports of entry 189
    prices 191, 192
    principal consumers 188
    sources of imports 188

Page
Ties, specifications 190
    switch 191
Timber, measurement 81, 82
    native, reserve supply 9
        value by species 20
Timber Agents and Brokers Association of the United Kingdom 31
Timber Trades Federation of the United Kingdom 16, 28, 65, 235
    standard contract forms 55
Tool handles, imports 322
Topography, Great Britain 1
Trade organization 27, 30
    builders' woodwork 306
    cooperage industry 246
    millwork industry 264
    plywood industry 319
Trade press as advertising medium 331
Trade statistics 2, 3, 4, 26, 27, 35, 36, 50, 51, 87, 90, 92, 94, 102, 104, 105, 127, 137, 140, 144, 151, 156, 171, 176, 187, 188, 193, 197, 230, 231, 233, 298, 321, 322, 323, 335.
Trade-marks, early use in cooperage industry 245
Transportation, Great Britain 4
    charges increased by unseasoned stock 326
Tub staves 242
Tupelo 163
Turnery woods 44

United States, as source of British supply 33
    doors 299
    exports of woods to United Kingdom, 1927 335
    mahogany lumber 144
    staves 232
Units of weight and measurement defined 39
Unseasoned stock, effect on transportation charges 326

Veneer, imports 197
    principal woods used 295
    production 295
Veneer, use in piano cases 283
Violin manufacture, woods used 284

"Wagons bottoms" 100, 218
Wagon planks 128
"Wagon scantlings" 215
Wainscot oak 131
Wainscoting, plywood panels 295
Walnut, African 157
    airplane propellers 291
    automobile steering wheels 258
    bank and office fittings 268
    "Benin" 157
    black 156, 258, 291
    Cape Lopez, characteristics 157
    Circassian 155
    dining-room furniture 222
    English 20, 158
    French 156, 270
    grades in demand 156
    importance 154
    parquetry 183
    piano cases 283
    plywood panels 295
    radio cabinets 296

Page
Walnut, sources of supply 155
  United States exports to Great Britain 156
  uses in British market 156
Warehouse construction 211
Warning to American exporters 29
Waste, utilization of 267
"Water-mark" disease of willows 285
Weavers' beams 288, 289
West Hartlepool as a lumber port 48
Whisky-case shooks 281
Whitewood, African 168
  See also Poplar, yellow; Spruce.
Willow 20
  cricket-bat 20, 285
  for polo balls 287
Window frames and sash 265, 309
Windows, display, for stores 268, 270
Wood, blocks for paving 271
  consuming industries 208
  containers, consumption declining 245
  laboratory research 13, 15
  lesser known, market possibilities 330
  manufactures, imports 298, 322
  substitutes, competition from 267
  utilization, research in 15
Woodenware for household use, imports 322
Wood-wind musical instruments 284
Wormy stock, complaints against 196, 260

Yard keeper, place in trade 29
Yugoslavia, as source of oak 130
  as source of softwood lumber 106
  principal lumber ports 106

○

MSH 04210

NEH OCT 2 7 1994

D350
B63

COLUMBIA UNIVERSITY LIBRARIES
0041439503

FEB 2 8 1929

END OF
TITLE